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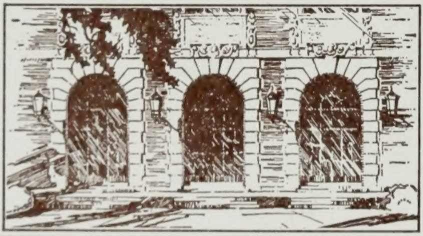

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ANTHONY'S

Photographic Bulletin.

VOLUME XXVII.

1896.

EDITORS:

Prof. CHAS. F. CHANDLER, Ph.D., LL.D.
FREDERICK J. HARRISON.

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OVER THE HILL

ANTHONY'S
Photographic Bulletin.

EDITORS:
PROF. CHARLES F. CHANDLER, PH.D., LL.D.
FREDERICK J. HARRISON.

VOL. XXVII. JANUARY, 1896. NO. 1.

THE NEW YEAR.

THE old year out and the New Year in—with the New Year spelled with capitals. Troubles and disappointments of the past forgotten, and, with hopes and promises of better times, the coming year is welcomed. We wish the photographic fraternity better times and feel that they are at hand. With better times, let there also come better work and a more pronounced fraternal feeling. The convention to be held at Chautauqua promises to offer an opportunity for a comparison of results, for an interchange of ideas, and for a discussion of methods, such as the professional photographer has never had previously. Let the object at the coming convention be not the medals and other awards, but the satisfaction that comes from seeing one's best efforts in comparison with those of others. The convention is not an arena for competition, it is a school where every photographer, great and small, professional and amateur, may learn many lessons.

To the amateur photographer we would suggest again the desirability of having an object in view. Promiscuous work is unsatisfactory. Get an idea and work it out.

To our subscribers we would express a hope that our efforts of the past year have met with their approval, and would make a promise that, with their support, we will endeavor to make our journal of even greater value.

To all photographers, we would send greeting and our best wishes for

A HAPPY AND PROSPEROUS NEW YEAR.

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HOME PHOTOGRAPHY.

WE have of late been advising the photographer to specialize, and have, in several articles, pointed out certain lines that might prove attractive. Of outdoor subjects, we might add to those already enumerated the photographing of odd doorways or windows, in which every city abounds, the placing on permanent record of old streets or street corners, and the photography of various street types that possess no little interest. The months that are approaching offer, however, particular inducements for home photography, and it is surprising how much may be done in and around the house that is calculated to interest the amateur, and to considerably instruct him. The first efforts of the photographer will probably be in the line of portraiture. The amateur's attempts in this line of photographic work have met with no little ridicule, but this has not always been deserved, and has not, fortunately, acted as a retarder, but rather as an incentive. It is too true that the majority of home-made portraits would never be mistaken for professional work, but it is also a fact that many of them are characterized by a freedom from restraint that in itself atones for many shortcomings. Again, the general public has been educated to call a photograph good when it possesses certain characteristics that, on proper consideration, cannot be considered attributes of an artistic picture. It is a fact, also, that in many cases, the picture turned out by the professional is not even a good likeness, and we have seen many photographs that bore but a very faint resemblance to the originals. In the home, amid familiar surroundings, with a model to whom the operator is not a stranger, and with all the comforts and natural accessories that are to be found around the house, the amateur photographer should, can, and does, turn out portraits that possess a merit not obtainable elsewhere. A word or two on a method that may be tried with advantage will probably be acceptable. A skylight is not always, indeed very seldom, at the disposal of the amateur, and his lighting arrangements must be of a temporary character that can be removed at the housewife's order.

J. Reuel Smith describes in "The International Annual" an application of the ordinary skylight found in the roofs of many houses, so that "any one who desires to get a gallery effect need only go to the top floor, and, having thrown a thin sheet over the skylight, pose his sitter, and do the trick. A looking-glass makes a good reflector, and a large sheet, half of it pinned against the wall, and the other half brought across the hall at right angles—with the lower part pulled forward under the victim—gives a continuous side, back and foreground, and at the same time furnishes the necessary side light."

However, in the majority of cases, the skylight is so situated as to be unavailable, and, in these days of floors and flats, some method of utilizing the ordinary windows will find greatest application. For this, a modification of the method proposed, we believe, by Mr. Eggenweiler, will be found of great service. In Eggenweiler's studio the ordinary skylight is dispensed with, and a large vertical window is let into the north wall. The light is reflected down by means of an inside roof inclined at an angle of 45 degrees, and is still further softened by a horizontal light-breaker made of white gauze veiling. The lower part of the window is covered with movable curtains. The application to an ordinary room is obvious. The window may be covered at the bottom with a partly transparent, movable curtain, and from the top of the window a white screen may be stretched at an angle of 45 degrees. An amateur friend of ours uses a white blind on an ordinary Hartshorn roller, and, with a reflector on the side of the sitter remote from the light, has been very successful in his efforts at portraiture.

Home groups rank among the most successful (and sometimes the most unsuccessful) of the amateur's efforts. By careful attention to details, and with friends who are willing and anxious to enter into the spirit of the thing, much can be accomplished. In this line, Mr. R. E. M. Bain has been particularly successful, and we would recommend our readers to study his work and then strike out in a line for themselves. A. L. Eidemiller is another amateur whose name is familiar among those who peruse the photographic journals, and his picture "Won't You Come to My Tea Party?" is an excellent piece of work.

KISS ME FIRST.
Copyright, 1895, by Strohmeyer & Wyman.

We have previously alluded to the photographing of interiors, and while the subjects of this character around the ordinary domicile may not be of a varied or artistic character, much may be done by arranging certain portions, posing a model in an appropriate position, and using artificial light, such as the flash light. Flowers and leaves present objects for study, though at this period of the year these are not obtainable, except by the fortunate possessors of hot-houses.

Another line of work which is fascinating in the extreme is photomicrography. While it is true that with the best of apparatus the best of results are only to be obtained, the ordinary microscope, within the range of the purse of the majority of photographers, will afford many an opportunity for work and instruction. In the November and December issues of the Bulletin some excellent advice on this subject was given by Captain Shelley.

Another subject on which the average amateur photographer is but little informed is the making of plates for the printing press, the production of zinc etchings and half-tones. In these days, when every periodical is illustrated, it behooves the photographer to post himself on the production of the plates for printing and to experiment in this line of work. It opens up a vast field in which there is yet great room for improvement, and yields pleasure and instruction to all who make it a study. Many are deterred because of fancied difficulties, and a notion that the methods employed are trade secrets. But in several issues of the BULLETIN the details of the methods adopted are described and there are several treatises on the subject that may be perused with advantage. Indeed, there are many photo-reproduction processes that might well engage the attention of the amateur photographer, who has already done much to advance photography.

In another portion of this issue of the BULLETIN, Mr. Sato, the editor of the Japanese photographic journal, *The Shashin Shimpo*, gives an account of the efforts of Mr. Tanaka. The illustration accompanying it—a picture, by the way, of our good friend, Mr. W. K. Burton—should encourage all our readers who contemplate taking up this most interesting of the applications of photography.

Items of Interest

THE Photographic Convention to be held at Chautauqua this year promises to be one at which much that is of value to the photographer will be discussed. The Photographers' Association of America has slowly been developing, and this year will, we hope, see it in a permanent home, with an excellent college of photography, at which diplomas will be issued, which will be recognized everywhere as evidence of the ability of their possessors. The Photographers' Association of America could undertake no better work, could provide for itself a permanent home at no cost whatever, and could protect the intelligent photographer from the many tramps that beset him. It would, we venture to think, raise the whole tone of photography and help in bringing about those better times that we are all looking for. We should be glad to hear from our readers on the points touched upon.

* * *

J. O. GRANT says that the great point to observe in lantern-slide work is to have a fixed standard for every detail of the process, otherwise uniformity of result could not be obtained. For instance, the light should be constant and regular, and one make of plate and developer should be used. With regard to the plate, there is no best kind, but there are plenty of good brands to select from. The worker should choose one and stick to it, and use a constant developer. As regards the illuminant, artificial light was preferable, it being more constant than daylight. The incandescent gaslight is a good thing, as it shortens exposure considerably. For exposing, a graduated scale of distances should be marked off from the light, so that the correct distance might be assured. It must be remembered that, theoretically, the light decreases in power as the square of the distance from the source, and exposure is made accordingly. This, however, must be modified in practice, for it would be found that, given theoretically correct exposures, less contrast would be obtained on a plate exposed near to the light than on one exposed farther away. This difference, however, might be utilized in dealing with strong and weak negatives respectively; the dense ones could be exposed nearer to the light than the thin ones. As regards intensification, reduction, etc., it is far better, if a good slide was not obtained at first, to make another than to waste time endeavoring to improve the first.

Photo by Donnelly. A LARGE FAMILY.

* * *

Paper, indestructible by fire, has been invented by M. Meyer, of Paris. A specimen of it, which was subjected to a severe test—one hundred and forty-eight hours in a potter's furnace—came out with its glaze almost perfect.

* * *

The well-meant efforts of the editors of *The Photogram*, having for their object a revival of interest in photo-ceramics, have been criticised somewhat adversely by some of the foreign journals, who find it easier to decry a contemporary than to make an effort on behalf of the photographic fraternity. It is a fact, however, that the articles on this subject, published by *The Photogram*, have created considerable interest in this country, and we have had many enquiries regarding this most beautiful of processes. At a demonstration before the Royal Photographic Society, the chairman " referred to the great beauty of photoceramics and their absolute permanence, which rendered them well worth the trouble of production, and suggested that a series of portraits of national celebrities by the process would be very valuable as a national record for future generations. For decorative panels, etc., for furniture, he thought this method of photographic printing would be of considerable utility."

* * *

The best method for reproducing coins and medals is to make a plaster-of-paris cast from them, thus avoiding all reflections from the metal surfaces. The plaster is slightly tinted to get rid of the excessive whiteness.

* * *

The *British Journal of Photography* says of " The International Annual ": " The editor and publishers are to be congratulated upon the beautiful get-up and the artistic and technical value of this volume. " The Annual " is a handsome book, full of good things appealing to practical workers.

* * *

A method of printing carbon tissue without transfer was described by Valentine Blanchard in a paper before the Royal Photographic Society.

" The process consisted in the immersion of ordinary carbon tissue in petroleum oil for about a minute, the paper support being thus rendered translucent, and the tissue, after the removal of the surplus oil, being placed in the printing frame with the support next to the negative, and then printed in the usual manner and developed from the front. Printing occupied about three times as long as usual, as the light had to penetrate the backing of the tissue, which was also stained a pale canary color, in consequence of the solution of a portion of the bichromate by the petroleum. It was necessary to immerse the tissue in the oil very rapidly and without a stoppage, as any hesitation resulted in the formation of markings which could not be removed in development, and quite spoiled the picture, although the immersion did not appear to affect the gelatine in any way. This was essentially an amateur's process, for the temperature of the water used in development was quite immaterial ; in fact, he had actually boiled one print, and found that the tissue did not leave its support. The use of a brush was advantageous for local development, heightening the lights, etc. Mr. Blanchard advocated the employment of paper negatives, as they could be printed from either side, and he showed several prints produced by the method he described from oiled negatives on albumenized paper which he had made some twenty years ago. For enlargements, he suggested the making of a full-sized transparency, which could be worked up as desired, and from which a dense print should be made on albumenized paper, carbon prints being made from the latter. In this case printing was effected through two thicknesses of oiled paper, the negative and the support of the tissue, and the result was a slightly diffused photograph, with a very pleasing softness, which, although unsuitable for small work, was excellent for prints of 12 x 10 inches and upwards. If any of the oil remained in the backing after development it could be readily removed by heat."

* * *

The *Inland Printer*, of Chicago, shows in the November number that Mr. S. H. Horgan, our editor of "Process Work," is the inventor of illustrating by telegraphing. This problem is approached by experimenters periodically, who all claim to be the first to solve it, and, strange to say, they all accomplish it through the aid of a chart similar to one devised by Mr. Horgan in 1879. The *Inland Printer* continues: "In 1879 the practicability of Mr. Horgan's chart was shown in telegraphic dispatches sent to the New York *Daily Graphic* during the famous rowing match between Hanlon and Trickett over the Thames course, in England. The correspondent of the *Graphic* followed the rowers in a steam yacht, dotting down upon the chart the fluctuations in the race, and connecting them by lines. When the race was over, he hastened to London, and cabled the key words in pairs to the *Graphic*, in New York. As fast as the words came they were made into a picture of the whole scene in the New York newspaper office. The race took place at 1 o'clock, London time. There is something over five hours' difference in time between London and New York. At 12.30, New York time, the *Graphic* was selling on the streets of New York, with the whole race accurately pictured out. Only twenty words were required to be telegraphed. Mr. Horgan, when manager of the art department of the New York *Herald*, used his chart to good advantage in the interest of that paper. In a description of his invention in the *Electrical Age* of December 10, 1892, its utility in the Harvard-Yale football matches was graphically described."

* * *

Every photograph sent out by the professional photographer is a standing advertisement for or against himself.

* * *

A circular announcing many changes in the *Photographic News* is to hand. The *News* will bear considerable improvement, but if the programme outlined is carried out, our other English contemporaries must look to their laurels.

* * *

T. W. Derrington recommends the following for the backing of plates, to prevent halation.

Caramel	1 ounce.
Burnt sienna or	1 "
Lampblack	¼ "
Water	2 ounces.
Methylated spirit	2 "

Dissolve the caramel in the water, add the finely ground color and then the spirit. Shake well before applying. Use a small sponge, dabbing the back of the plate.

A tele-photo portrait lens is promised by Dallmeyer, one that will serve the purpose of a battery of lenses, making large direct pictures possible.

* * *

We advise all our readers to purchase a copy of the *British Journal Almanac* for 1896. It contains J. Traill Taylor's latest contributions on photographic optics, which will be read with the greatest interest.

* * *

James Martin, in the publication above alluded to, gives the following hints on lantern slides: "Remember that gelatine is peculiarly hygroscopic; therefore keep all slides in a dry place. Remember that the rays from an oxyhydrogen flame are not only luminous, but calorific; therefore show your slides as short a time as possible, and do not bake them till they blister."

* * *

"When trees are leafless and fields bare, and some of the sweetness of out-door photography gone with the last rose of summer, the picture galleries should yield a rich harvest of suggestions to the serious student of photography."—*The Amateur Photographer* (Eng.).

* * *

I can strongly recommend those who have lanterns to take up flower studies as forming a very pleasing change from the everlasting run of landscape and architectural slides.—W. Cooper.

* * *

For reducing over-dense lantern slides soak for a short time in

Perchloride of iron solution	¼	ounce.
Hydrochloric acid	½	"
Water to make	20	ounces.

And, after washing, immerse in fresh hypo.

* * *

Thin slides may be intensified in the following solution:

Uranium nitrate	15	grains.
Potassium ferricyanide	15	"
Glacial acetic acid	1	dram.
Water	5	ounces.

Wash in water acidulated with acetic acid.

* * *

Among the novelties likely to interest the amateur photographer at this period of the year, none is of greater value than the new flash cartridge, put up in novel and convenient form as Bostwick's "Perfect" flash cartridge. A small metal box contains six powders, any one of which is amply sufficient for an exposure. The paper cartridge is slightly untwisted, placed on a coal shovel, lighted, the lens cap is removed, and the exposure made. No burning box or paper is left, and the quantity of smoke is very small. For the winter evenings they should come in useful.

SOME CURIOUS PATENTED ACCESSORIES.

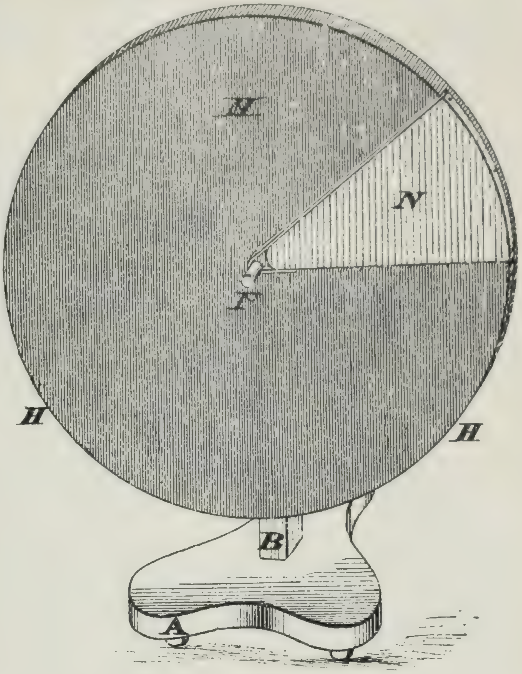


Fig. 1.

IN the records of the Patent Office may be found many curious and exceedingly ingenious devices. Of these the art of photography has its share. For instance, one patent describes the background, shown in Fig. 1, by means of which the effects produced by the shaded background, which has lately created such a stir, as well as other effects, can be produced. A shaft, carrying a large disc, is pivoted in a standard which is supported on a base mounted on casters. This disc is covered with the ordinary background material of an even tint all over. To produce a lighter shade on the dark side of the face, a card of lighter tint is fastened to the disc in the center of the part where the lighter effect is desired. A weight is then placed in a pocket on the lower edge of the disc, and if the disc is set to oscillating during the exposure of the plate, the motion will blend the light and dark shades evenly together.

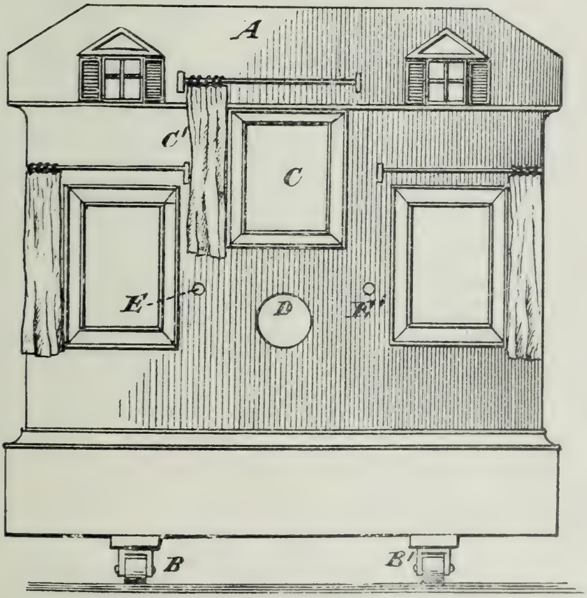


Fig. 2.

By fastening a card of the proper size and depth of color to the disc and giving it a rotary motion, the effect of the whole surface may be made lighter or darker as desired. The rotary motion is produced by winding a weighted cord on the shaft.

Another patent shows a screen, which is intended to conceal the operator from timid children, who become frightened at having the camera pointed at them. The screen (Fig. 2) has somewhat the appearance of the front of a house. There are three curtained windows in different positions and in different elevations, and in one of these some mechanical toy is set in operation. The lens is exposed through a circular aperture in the center of the screen, and at each side are peep-holes.

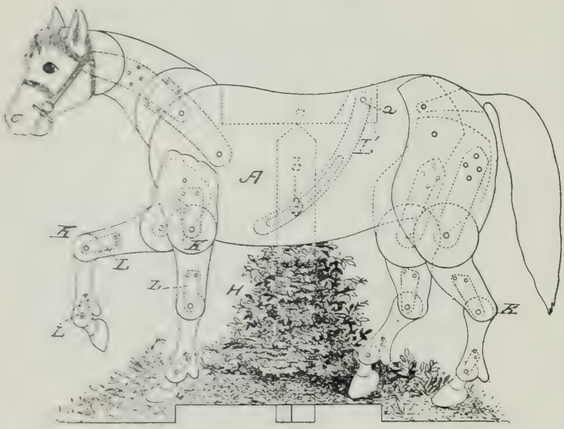


Fig. 3.

An artificial horse is the subject of another patent. A life-size image of a horse (Fig. 3) is cut out of thin wood or sheet metal, and joints are provided at the points where they occur in the natural horse. The body is adjustably supported on a stout standard, and the standard is concealed by bushes, which rise to the horse's belly. A saddle is also supported by the standard. The whole image is covered with the skin of a horse, and imitation harness is placed in position.

By means of this accessory the photographer may catch the general on his charger as he prances over a stump, or the charger may be converted into gentle Dobbin whom little Johnnie is leading to water.

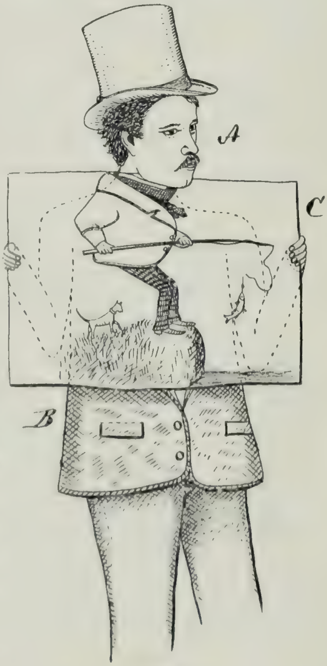


Fig. 4.

A method of producing caricatures is disclosed in a fourth patent. The body and its surroundings, as they are to appear in the caricature, are drawn on a piece of cardboard, the body, in order to increase the ludicrous effect, being drawn much smaller than life (Fig. 4). This cardboard is then held so that the neck of the drawing is under the chin of the person whose head is to form the head of the caricature, and a photograph of the whole is taken. If the cardboard is of the same shade as the background used, the effect is quite natural when all that does not relate to the caricature is cut out of the picture.

The inventor of the scheme illustrated in plan shown in Fig. 5 has sought to render it easy to change the accessories from one scene to another, and to make it possible to show a subject a variety of scenes from which to choose.

Four scenes, with background, foreground and other accessories, are mounted on a platform which can be rotated; for instance, a marine view comprising a boat, an interior scene, a forest scene, etc. These can be rotated into the field of view quickly and without moving any scenery. By shifting the platform, two or more views, with different lighting, can be obtained without moving either the subject or camera.

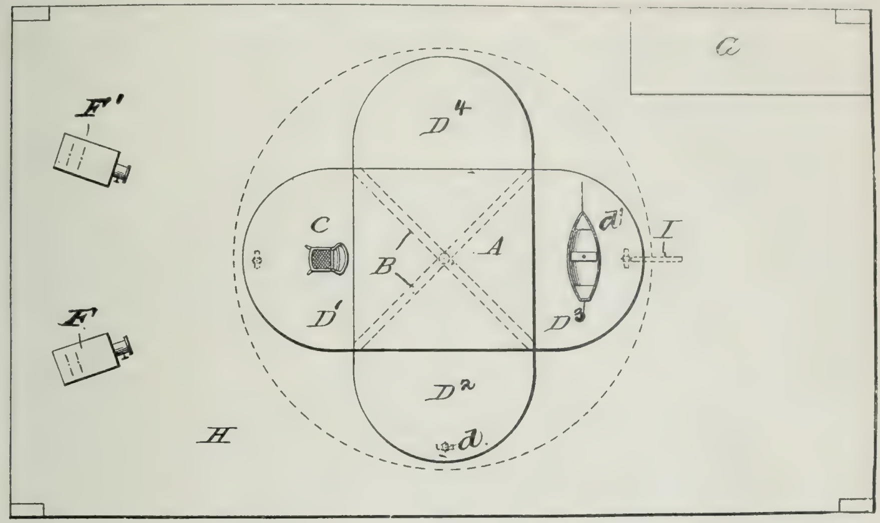


Fig. 5.

E. J. Prindle.

DISSOLVING VIEWS BY THE STEREOSCOPE.

THE effectiveness of dissolving views is well recognized. They have hitherto been confined to the exhibition of pictures by the lantern, but such are tame compared with the dissolving of one stereoscopic view into another.

Stereoscopic dissolving views are very rarely, if ever, now come across, unless it may be in the collection of a few of the *cognoscenti*, and these rather on the Continent than in this country. They had just been introduced, and were beginning to be appreciated, when the cloud descended in which the whole system of stereoscopicity was enshrouded, although only for a time, as we now know. The solidity of an image in the stereoscope conduces to the superiority of the effect when a pair of flat pictures are made to dissolve one into the other in the optical lantern. In the case of interiors, we see chairs and tables getting gloriously mixed. Some one article of furniture will be seen to slowly plant itself in front of some other article ; pictures on the wall become at first hazy, and are then found to be fast being supplanted by others ; Ariadne and her tiger are being deposed by Una and the lion, and Hercules fades into nothing as Cæsar advances. All this must be seen to be adequately appreciated. And besides—and in this lies a strong point of vantage—all this may be seen at one's own fireside, free from the trouble and fuss of having to unlimber and fit up a pair of lanterns by which to have them projected on a screen.

A dissolving stereoscope may be fitted up so as to form an elegant addition to the *bric-a-brac* on the parlor table or drawing-room window, and when constructed as a thing of beauty, it will emphatically prove a joy for ever.

To aid in their coming I will now give an account of the principles involved in their construction, and, in doing so, will assume that the slides are printed as glass transparencies.

Speaking in general terms, the principle of the dissolving stereoscope is this: A slide is placed behind, in a closed stereoscope, and in the usual position for examination, and a second slide is placed above or below, the top being cut open. While the slide at the back is being examined, a silvered reflector, standing at an angle of 45 degrees, between the eyepieces and the picture, is slowly lowered or raised until it cuts off the direct view and shows only the slide which lies on the top of the instrument.

This is the general principle, but departures may have been made in working out details. For example, I have mentioned a silvered reflector for effecting the change in the direction of the rays ; but I have known of the reflector not being silvered at all, but consisting merely of a small sheet of plain patent plate glass, the surface of which, standing at the slope it does, reflects sufficient light to enable the second picture to be seen with sufficient distinctness and under conditions of sufficient luminosity. When a stereoscope is made with a simple reflector of this nature, very little work indeed is entailed in its construction. The whole work of dissolving is then effected by a pair of flap shutters outside of each picture, by which the light is cut off, and thus cannot enter the stereoscope. Upon making a trial of this plain glass reflector, I find that, when all light from behind is debarred access, and the inside of the stereoscope well blackened, its reflecting power is very considerable, and quite enough to show the upper picture with a fair degree of brilliance. It possesses this advantage, that, when the light from the upper picture is shut out, the direct picture behind is seen with quite as much seeming brilliance as if the sheet of plain glass were not interposed between the eye and the slide.

The act of dissolving with a fixed plain glass reflector such as described consists in having the respective flap shutters, which cover the transparencies on the outside, geared together by a metallic strap or rod, so that when one stands quite open, the other is entirely shut, and *vice versa*. By the same movement which opens the one, the other is closed. The mechanism involved in this is far simpler than might appear from reading this description, and is not for a moment to be compared with the far greater drain on one's mechanical skill involved in the construction of even the simplest of our modern hand cameras or shutters.

But the refinement of this system consists in having the reflector composed of platinized glass—that is, glass which has had a very thin coating of platinum given to one side and then vitrified. Previous to vitrification, the platinic deposit should be thinned away at one margin, so as to merge gradually into clear glass. By this means, and by a slight movement of the reflector up and down, the acme of perfection in the reflecting portion of the screen may be had in one portion and perfect transparency in another.—J. TRAILL TAYLOR, in *The British Journal Almanac.*

SOME NOTES ON PHOTO-MICROGRAPHY.

IN a paper read before the Lewisham Camera Club, Mr. W. I. Dibdin showed that the amateur photographer, without any great outlay, can take up photo-micrography. He said:

" The exceedingly beautiful drawings of combined microscopic and photographic apparatus, which have been placed before the public for some time past, and the still more beautiful results which have been obtained by their aid, have had the effect of somewhat deterring the amateur from embarking in an undertaking which would seem to be fraught with so much expense for apparatus, and so difficult to accomplish with anything like the success gained by other operators.

" It is with the view of submitting some results obtained by comparatively simple means that I venture to address you this evening. I have really nothing novel to submit, but, having noticed various difficulties with some operators which others have quietly met and put on one side, I thought it would be useful to spend an hour in chatting about them.

" The special points which may be considered are as follows:

1. The microscope, etc.; lens and eyepiece.
2. The illumination.
3. The camera.
4. Adjustment of image on ground-glass.
5. Exposure.
6. Development.
7. Plates, isochromatic or ordinary.
8. Printing.

" Each of these might easily be dealt with at such lengths as to make a separate lecture, but for our purpose this evening they may be lightly dealt with so as just to bring out salient features.

" The microscope stand may be of the simplest kind, if it has a fine adjustment, and, better still, if provided with an achromatic condenser; but this is only necessary for high-power work, simple reflected illumination being sufficient for work with a ¼-inch objective. The provision of a set of apertures to act as stops, or an iris diaphragm, is desirable, but not in all cases essential, as more may be done by oblique illumination by the concave mirror than many operators are aware, provided that the objective employed has a large angular aperture.

" It has been supposed that some extraordinary solid support is required for the microscope and camera, but I have not found this to be the case for ordinary work, good results having been obtained on an ordinary steady table in a top room of a house in London. Of course, if a very high degree of magnification is required exceptional care must be taken.

" Doubtless the most suitable lenses are the recently introduced apochromatics, which are specially adapted for this work; but the ordinary lens of a good maker is equally capable of good work if carefully used, and, when necessary, a slight alteration of the focus may be made. In the same way an apochromatic eyepiece is best, but the difference is trifling. If the camera is, or can be, made sufficiently long, then the eyepiece need not be used, the direct image given by the object glass being sufficient. Eyepieces have been constructed with a focusing adjustment to correct the image thrown by the object glass for varying focal distance and to clear marginal definition in the negative; but as this latter can be compensated by a mask when printing, and the former is only necessary with high-power work, it is like so many of the other accessories, a convenience, but not a necessity in the case under consideration.

“The illumination of the object is undoubtedly a point of the first importance, and some little trouble may be taken with it to advantage. Next to the arc light, the limelight is, where available, the most satisfactory to work with, as by it the focusing is rendered much easier, and the manipulation generally greatly facilitated. When using this powerful light, an alum cell is a great safeguard, as, if care is not exercised, and a small aperture employed, there is much danger of cracking the front lens of the objective. Good results may be obtained with daylight or an ordinary paraffin lamp, the latter in many cases being preferable to the uncertainty of changing daylight in this climate, especially during the winter months.

“The camera may be any ordinary one of the size which it is required to take the photograph. For the purpose of quarter-plate work I have had constructed a small camera which fits on the eyepiece of the microscope; this was found to be exceedingly convenient in working. When an object was found of which it was desired to take a photograph, the little camera was fitted on the eyepiece, the microscope being placed in a vertical position for steadiness, and a plate rapidly exposed, the camera removed, and the microscope left ready for further use. If, however, larger plates are required to be used, the microscope should be placed in a horizontal position, a piece of cardboard of some 6 or more inches diameter, having a circular aperture the exact size of the eyepiece tube, being cut out of the center, placed over the eyepiece, which projects into the camera in the place of the usual lens; the cardboard, being large enough to completely cut off all stray light, makes a suitable connection between the microscope and camera. Any stray rays which might find admission between the camera front and the cardboard may readily be excluded by the focusing cloth.

“The camera must be carefully adjusted, so that the center of the plate is in the line of collineation of the microscope, and perpendicular to it, so as to ensure equal focus all over the field.

“The object to be photographed having been mounted on the microscope stage, and centered so as to show well on the ground-glass of the camera, the real difficulty commences, especially when an achromatic condenser is employed. This must be very carefully centered as well as the light, so as to ensure even illumination over the field, otherwise the resulting negative will have a most objectionable cloud on one side. Next comes the focusing. This should be first done with as large an aperture in the substage diaphragms as possible, consistent with safety when the limelight is used, to secure sufficient light for the focusing, then the smallest diaphragm should be put into position, and the light cut off by a suitable screen, or reduction of the oxygen if the limelight be employed. Next insert the dark slide, and when ready turn on the light for the time required to make the exposure—this will be found to vary from a few seconds in some cases to ten or twenty minutes, it being evident that the shorter the exposure the better, especially when the object is mounted in water, as the effect of vibration is thereby lessened, and less time is allowed for evaporation. The plate may be now developed in the usual way, plenty of bromide being employed to give a clean image, and the development should proceed until a fairly dense negative is obtained, the great difficulty being to get clean images.

“With reference to the most suitable plate, there is great difference of opinion. Some operators express an opinion in favor of ‘isochromatic’ plates, but my own experience has not shown any special advantage in these, a good thickly coated plate being the great desideratum, as tending to give greater contrast; this point is one which each operator must settle for himself, according to his own method of working and the character of the results required.

“The print may, with advantage, be first made on a masked paper, so as to leave a white border, and then, by the use of a central mask neatly adjusted, the white border should be printed to a suitable tint rather than a deep black, to show up the high lights of the picture. If the border is printed a deep black at the same time that the print is exposed to the light, the effect is not so good, and it will be found that the toning bath will be rapidly exhausted, this over-printed surface absorbing gold at a most expensive rate.

“For the purpose of recording microscopical examinations in technical cases, probably no better way exists than to take quarter-plate views by the small camera above referred to; these may be produced at any time as evidence, and entirely obviate any question arising as to the *bona fides* of the observer, who thus shows himself ready to submit to any cross-examination, and thereby necessarily greatly strengthens his position.

"If it is desired to emulate those beautiful photographs of diatomacea, etc., which are exhibited from time to time, the novice must be prepared to spend no small amount of patience and plates to their accomplishment. So much depends upon the accurate arrangement of the light and the focusing screen, that the requisite skill can only come by simple work, as in so many other cases, and no one need be dismayed at a few failures at first. There is no secret or patent method, it being merely a question of manipulation. The light, lens, plates and chemicals will do all the rest."

NOTE ON THE SENSITIVENESS OF PICRATED GELATINE TO LIGHT.

I HAVE recently been using plates of glass coated with films of gelatine containing picrate of ammonia for various purposes. All were made by coating glass in exactly the same way as gelatino-bromide plates are coated by hand, using a solution mixed in the following way:

A saturated solution of picric acid at 65 degrees Fahr. (about 1 per cent.) is made, ammonia is added till the solution has a perceptibly ammoniacal smell, when it is diluted with water to half its original strength. To each ounce, 20 grains of hard gelatine are added, and when this has softened, the solution is heated to melt the gelatine.

The ammonia forms, with the picric acid, picrate of ammonia. The acid and the picrate do not perceptibly differ in color, but Mr. K. Arito discovered, some time ago, that the picrate gives a more textureless film than the acid. The reason for diluting the solution is that, unless this is done, the salt is liable to crystallize out of the gelatine during drying. The coating of the plates is of different thicknesses according to the use for which it is intended.

The first use I made of such plates was for color screens in orthochromatic work the results with them being, in my hands, better than with any single color that I have used, at least as good as with a pair of Burchett screens. Patent plate was used, and was placed film to film with the photographic plate in the dark slide.

Other applications were to printing, graded screens being used for negatives that needed more printing at one side or end than at another, plain screens being used for those printing processes—and there are several—which give distinctly better results when printing is done by a light yellow light, than when by white light.

Glass thickly coated as described makes a useful medium for lanterns to give light for working films not over-sensitive, such as wet collodion, gelatino-bromide or chloride development plates or films, or bromide paper. The light is particularly pleasant to work in, scarcely differing appreciably from candle, gas or oil light of the ordinary kind, and being many times safer.

Mr. C. D. West, M.A., and myself were both using picrated plates in connection with sun-printing, when we both noticed that the plates seemed to darken after a few days' continuous exposure to sunshine.

Experiments were made to determine with certainty whether the action was actually due to light or not, and it was very soon proved that it was. In fact it was found possible to make prints from negatives, although a very long exposure is necessary. The change is from a pale-lemon yellow to a deep yellow.

The small plate sent as a sample had an exposure under a moderately dense negative of about one hundred and fifty hours to the sunshine of winter in Japan, which may be taken as equal to the brightest summer sunshine in England.

On soaking in cold water the unchanged picrate washes out, the color of the changed picrate lightens, but even several days of washing fails altogether to remove it. The image will, after washing, be seen to be in relief, the parts that were protected from light being high.

The picrated gelatine affected by light is insoluble in boiling water. Films of gelatine and picric acid seem to be just about as sensitive as those of gelatine and picrate of ammonia. Picric acid in the solid form is not sensitive to light—at any rate shows no change after one month's exposure in strong sunshine.

Neither picric acid nor picrate of ammonia in aqueous solution is affected by long exposure to light. I have made no experiments with picrate of ammonia in the crystalline form, as I believe it is a highly dangerous explosive; nor have I made any experiments at all with other picrates than that of ammonia.

I do not expect any wonderful results from the use of a substance that requires an exposure of 150 hours in brilliant sunshine, much less that its use should lead to such a revolution in photography as has been brought about by the use of bichromated gelatine, founded on the observation, by Mungo Ponton, that paper soaked in a solution of bichromate of potash changed color in the light; still it is of some interest to know that, except for the length of exposure needed, the effect of light on picrated gelatine is practically the same as that on bichromated gelatine.

The only practical result of the discovery, so far as I have gone, is the production of a medium excellent for the illumination of darkrooms. The darkening of the color is very marked, and it might be supposed that the visual light transmitted by the darkened film must be much less than that transmitted by the unchanged film; a trial, however, proved that the quantities of visual light transmitted through the two varied only as $5^2 : 6^2$, or as 25 : 36; roughly as 2 : 3, while, visual light being equal, the safety of the light, transmitted through the darkened plates, was several times that through the others. To my own eyes I found the exposed picrate a considerably safer medium than the best stained red glass that I have been able to obtain, visual light being equal.

It need scarcely be stated that the slight sensitiveness of picrated gelatine here described does not in any way invalidate the use of plates coated with this substance as screens for orthochromatic work. Such plates, protected from all light but that received during exposure, would not be perceptibly changed in color by light action in many years, in fact not before some hundreds of years. I do not, of course, know what may be the effect of mere atmospheric exposure in a number of years, but I have no reason to suppose that it would result in change of color of the picrated gelatine.

In these degenerate days, when the majority of photographers probably scarcely know how to coat a plate, it may be useful to know that a picrated screen may be made by fixing an unexposed gelatino-bromide plate in hypo solution, washing it and staining by laying for a few minutes in a solution of picrate of potassium. However prepared, it is advisable to varnish the film, as thereby the surface is perceptibly improved.—W. K. Burton, in *The Photographic Journal.*

* * *

Two new lenses are announced by Dallmeyer, a stigmatic portrait lens, *f*/4, and a soft-focus lens, the Dallmeyer-Bergheim lens. Full details of these will be given in our next issue.

* * *

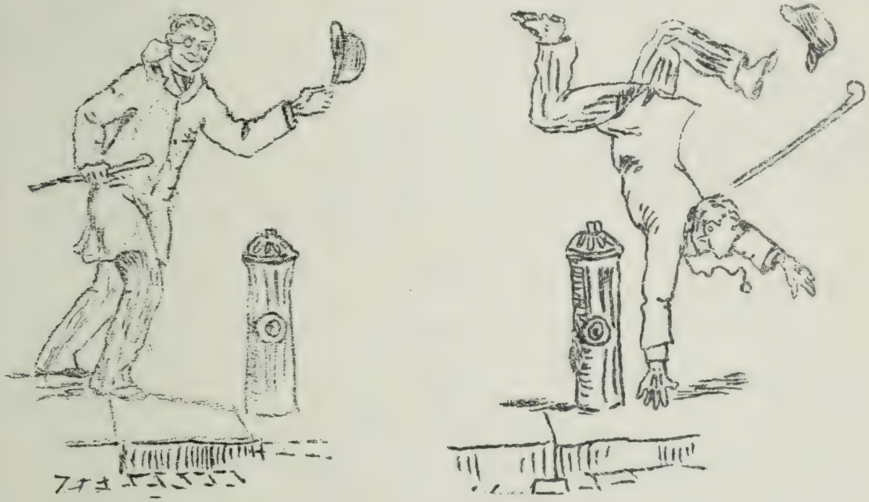
For the present, we may say that the stigmatic portrait lens is composed of two triple combinations, and is designed to include an angle of about 60 degrees, being therefore particularly adapted for short operating rooms. The Dallmeyer-Bergheim lens is composed of a single front lens of positive focus in combination with a single back lens of negative focus, the distance between the two being variable, thus giving considerable latitude of focal length. A softness and delicacy is obtainable with this lens that will please photographers. When stopped down, defining power and sharpness increase, this being absolute with about one-third the full aperture.

A wide-angle Universal lens working at full aperture of *f*/6, and corrected throughout for spherical, chromatic and astigmatic aberrations, will also soon be issued by Dallmeyer.

LANTERN SLIDES WITHOUT THE AID OF PHOTOGRAPHY.

EVERY teacher knows the value of illustration as a method of awakening interest in, and of imparting knowledge to, both young and old; and now the projection lantern obtains to a degree which renders argument in its favor superfluous. In my opinion, object teaching is the true way to impart knowledge, and, when the object is an impossibility on account of its size, or other reasons which make its use inconvenient, photographs of it, in all its various details, act as a superb counterfeit of the real thing.

Having made constant use of this invaluable apparatus in my class-room for many years, I feel somewhat acquainted with it; in fact, it would be like losing my right hand to be deprived of it. One of the first difficulties to present itself was some simple method of making a slide without going through the slow and expensive photographic process, the usual method of slide production. All sorts of printing dodges were tried, then various thickened inks, thinned paints and drawing instruments were pressed into service, but without success; the desired method was unattained. One day, while making a large transfer map, the happy thought suggested itself of transfer on glass. Eureka! No sooner thought of than attempted, and the long-wished-for result was accomplished.



Copied from *Life*. Reproduced from actual slides.

A $3\frac{1}{4}$ x 4 lantern slide cover-glass was cleaned, a suitable piece of black carbon transfer tissue (such as typewriters use) was placed upon it, and then a drawing, hastily torn from an illustrated paper, was carefully placed on top of the carbon tissue. Then, with a sharp pencil, the lines were quickly traced. Upon removing the carbon tissue, an excellent tracing was found on the glass.

My lantern was then lighted, and the tracing was projected on a screen, in order to test its utility. The effect was that of a charcoal drawing, and answered the purpose beyond my wildest hopes. Zinc etchings of the originals of my first transfer slides accompany this article.

The slides were matted and mounted just as an ordinary slide would be; but this, of course, is not necessary, unless the slide is to be preserved. The many uses to which this simple method can be applied are numberless.

All kinds of mathematical formulas, geometrical figures, mechanical drawings, diagrams, maps, comical ideas and hymns may be traced in a few moments, and projected at once. After using the slide, the glass may be cleaned with a piece of cloth, and another tracing made upon it.

I have traced maps and comic line drawings on gelatine, and then applied colors with good effect.

Good use may be made of photographic plates which have been accidentally exposed to light, or are too old for photographic purposes, by simply placing them in hypo to remove the silver, washing and drying them, and then using them for tracing for colored subjects.

I have frequently made three or four tracings during a lecture before a class. If one has skill in drawing, beautiful results may be obtained.

This ever-ready, simple dodge has saved one individual so much time and temper, that he feels like making the new year brighter and easier for some fellow-worker, and hopes this will serve the purpose.

DWIGHT LATHROP ELMENDORF.

TRANSFERRING FILMS WHILE WET.

WE wish to explain in this article how very simple an operation is the removal of a wet film and its transfer to a plain piece of glass. There is nothing novel in the process, yet, if we were to take a poll of the photographers who, when they have a cracked negative, make any attempt to remove it from its first support and place it on another plate free from injury, we should find an exceedingly small number who have ever even attempted to carry out this simple mode of remedy. Instead of doing this, all sorts of dodges are tried to get rid of the effect of the crack in the printing. But not alone is there an advantage in remedying a broken negative; while performing the transfer, it is just as easy to reverse the film as to place it in its original position, and we have then a plate suitable for carbon printing or collotype work.

Then, again, though frilled plates have for a long time been of exceptional occurrence, occasions do arise when the defect is experienced, and particularly is this the case with a recently introduced make of plate which, possessing, as it does, certain positive advantages in a particular direction, is very liable to frill. We have seen a negative on one of these frill in half a minute's time for a distance of 2 inches from the margin. Under such conditions, though it is possible to reduce the frill by alcohol, there is usually a difference of density between the frilled margin and the rest of the plate. All that then is needed is to remove the entire film and place it on a fresh glass; the frilling does not show, and a perfect negative is the result.

The removal of the film is brought about by simply leaving the negative to soak in a dilute solution of almost any acid, the effect being the gradual entire loosening of the gelatine film. When this method was first published, and for some time afterwards, the use of hydrofluoric acid was considered necessary; but we believe Professor Burton was the first to point out that the solvent action of this acid upon the surface of the glass was not, as was thought, the necessary element in the loosening; he pointed out that almost any acid would produce the same effect. Possibly citric acid is as suitable as any, but sulphuric, hydrochloric, nitric, and other acids are also effectual. Nitric acid is contra-indicated on account of its solvent action on the image, but we have, under stress of circumstances, used it without any apparent deterioration of the negative. We may here point out that, concurrently with the loosening of the film, an enlargement of its dimensions also takes place. There are occasions when this is an actual advantage, and when working with large plates it is not often the case that the size and proportions of the view or portrait are so accurately arranged that an enlargement would be a detriment. It is, however, necessary, if enlargement of the negative be contemplated, that it should be more dense than usual, for it goes without saying that if, say, a square inch of image be spread over 2 square inches, it will possess a decreased light-obstructing power. These, however, are side issues on the main question, and it will not be needful to do more than thus cursorily to refer to them.

We will suppose a cracked negative is under treatment, the film itself being, of course, understood to be unbroken. If it is varnished, the varnish will, for the process we discuss, have to be removed. Soaking for some time in methylated spirit, followed by successive washes of fresh, clean spirit, will usually suffice, without any potash or other addition, although a few drops of ammonia in the last spirit will prevent any possible precipitation of the shellac of the varnish upon the plate.

The varnish removed, the plate is removed to a 5 per cent. solution of acid in water. After the lapse of an hour or two the film may, perhaps, be seen floating above the glass, or it may be still adherent in one or two places. In the latter case a firm, but gentle, pushing with the finger will cause the adhesion to give way. The broken glass can then be removed and a larger piece placed under the film, after which glass and film may be transferred to another dish of water, and finally into another of distilled water. A good sample of tap or river water will answer; but, if the supply contains much lime, it should be rejected, for obvious reasons.

At this stage all that is now required is to slowly and carefully lift glass and film out of the water. This can easily be done by pinching the film to the glass at one side by the finger ends, raising that end slowly, tilting the whole and withdrawing it gradually, and setting it up to dry

It will usually adhere without any substratum, though, if necessary, the final support may have a covering either of gelatine or collodion, washed before it is dry. If it is found that, when the film and its new support are removed from the water, it is not quite squarely placed upon the glass, it can be, without any great difficulty, adjusted with the fingers.

If the negative is to be reversed, the film, while in the water, may be turned upside down without the slightest difficulty.

So far, we shall have a negative enlarged from its original dimensions, and this is the best way in which to obtain facility in an operation which is really far more simple than this description would suggest. If it be desired to reduce it to a smaller, or its original dimensions, the film must be transferred to a bath of methylated spirit; it will then quickly shrink to its proper, or even a smaller, size. The operation of transferring is just the same, but it must be very quickly performed or wrinkles in the film may be produced.

Finally, it may be observed that the extent of this shrinkage may be reduced by diluting the spirit with a small quantity of water, which, at the same time, will reduce the difficulties of transferring with spirit.

If at any stage it be found that a bubble of air has become imprisoned, it may be squeegeed out by the finger or by a mop-shaped camel's-hair pencil. When the transfer is out of the spirit, cases may arise where it would be advisable to immerse the whole in the liquid again, and work the bubble away while all was underneath the surface.

In conclusion, we would say that any of our readers who have never attempted this simple mode of transfer will be surprised at the ease and simplicity with which it may be performed.—*The British Journal of Photography.*

DEVELOPING ORTHOCHROMATIC PLATES.

CONSIDERING that the undoubted advantages which orthochromatic or isochromatic plates possess when applied to their own specially adapted purpose do not in any way unfit them for ordinary landscape or portrait work, it is somewhat remarkable that their use is not more widespread than appears to be the case. In fact, quite recently the question was put to us, Why should not this class of plate be used to the entire exclusion of non-orthochromatic? The answer, of course, is simple enough: There are, comparatively speaking, few makers of the latter plate and a large number of the former, and already plate-users are beginning to develop a decided conservatism of practice, and are not so ready to chop and change as once was commonly done. Outside all these considerations, however, there is another which we think mainly operative. This is the fear of fog in the darkroom through the use of "unsafe" light, or the difficulty that would be experienced in working with a "safe" light. Now, we have long since pointed out that there is no such thing, even for an ordinary plate, as a safe light, and that the term is purely a relative one.

It may be taken as true that all visible—besides, of course, many invisible—radiations, if allowed to act for a sufficiently long time upon the average dry plate, will produce a developable effect. It is thus evident that, in judging of what must be called the expediency of a light for the darkroom, three factors must influence the decision—the time element, the actinic element and the luminosity element. At present the data on these three points are not sufficient to enable any one to say, *a priori*, that a particular light screen is must suitable; and, of course, the window most suitable for one plate is less so for another, and so on; hence a universal screen, the best for all purposes, is not possible.

But this need not act as a drawback to the use of orthochromatic plates. It may be taken that a large number of photographers, in the laudable endeavor to secure their plates against fog in the darkroom, use a light far within the limit of safety for ordinary conditions of working—a light which would not fog a plate if it were left exposed for three or four times the normal probabilities. We have, when changing ordinary plates away from home, frequently discarded all use of yellow screen or ruby lamp. Placing a candle outside the bedroom door, more or less ajar, according to our position in the room, we have unhesitatingly, using the most sensitive plates we have tried, emptied and recharged slides with sufficient illumination from the reflected candlelight to be able to see what we were doing. But then we worked with discretion, exposing each plate for the minimum possible time, and the result was that not a trace of fog was perceivable on any of the plates so treated. But, if the plates during changing had been spread out in a row and put away or in the slides one by one in leisurely act, the result would have been disaster. The moral we would draw is, that if such a light were, under the conditions, safe with an ordinary plate, it would also be safe with an orthochromatic plate; but the sensitiveness of the most ultra-orthochromatic plate ever made to the yellow and red radiations is very far indeed below the sensitiveness of an ordinary plate to white light; hence a luminosity emanating, say, from the D region of the spectrum might be used for a yellow sensitive plate with an intensity far exceeding that we have been describing. We may be told that it is no news that the part is not equal to the whole, but the luminosity of the light from this region may be increased to a degree beyond that due to it as a constituent part of the whole luminous spectrum, and yet remain "safe" under the conditions.

To put a practical point upon our remarks it will be proper to describe a series of experiments we made in one of the darkrooms we work in largely. It is lighted with an overhead lamp, screened with a combination of glass and fabric, which, under our mode of working, never gives fog. There is plenty of light in the room, except in the place where the plates are changed; the developing dish can be placed in a graduated light, according to the period of time it will be exposed. There is also another light, screened with two colors of glass, and capable of being reduced or altered by other additions, but which only illuminates the plate when brought before it for examining density, etc. We are aware that we work well within the bounds of safety, but we have light enough now without making any alteration or change of system or lighting whatever. We worked with a number of a well-known brand of orthochromatic plates, and not a single plate was the worse for the treatment. Here is distinct evidence that there is no practical difficulty whatever in working orthochromatic plates with plenty of light to enable one to develop in comfort. But, just as the use of the naked candlelight described must be conducted with judgment, so must the use of ordinary darkroom light for orthochromatic plates. It is perfectly safe when used with Opie's oft-quoted medium and with ordinary judgment.—*The British Journal of Photography.*

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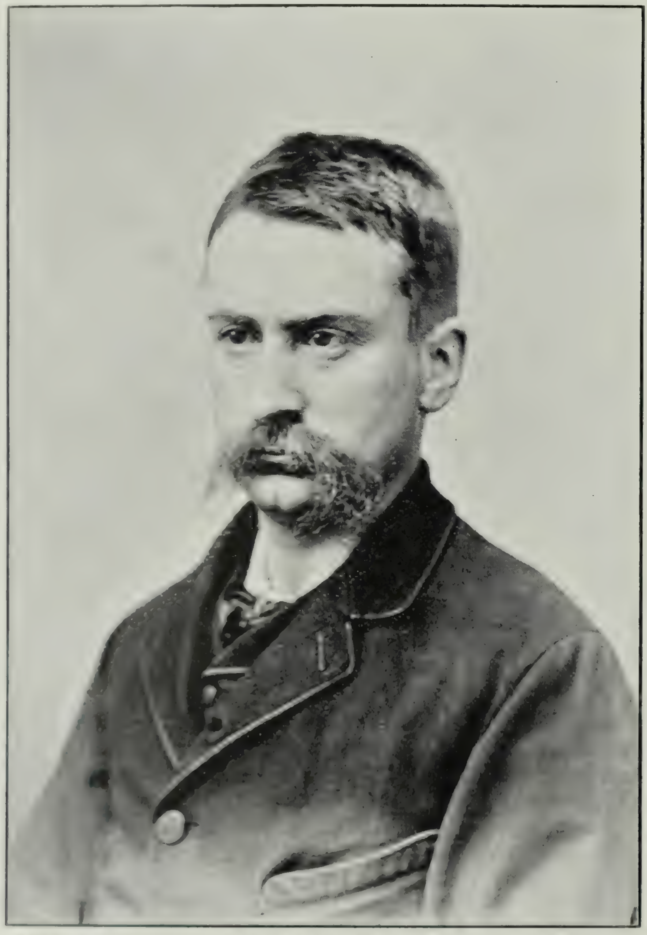
Two well-known annuals come to hand just as we are going to press. *The British Journal Almanac* for 1896 is one of the most useful publications in existence. The chapters on optics and on the wet collodion process are worth a hundred times the subscription price. *Mosaics* for 1896 is a daintily printed book, full of practical matter contributed by many prominent professional photographers. The illustrations are object-lessons of no little value. The book is of size convenient for the pocket, and will be found a handy guide and reference manual.

FIRST EXPERIMENTS IN HALF-TONE BLOCKS BY MR. I. TANAKA.

THE adjoining specimen is the first block made by our friend, Mr. I. Tanaka. Mr. Tanaka is an amateur photographer, and he began his experiments in block type but recently. Before commenting on the block it may be interesting to the readers of the BULLETIN to give a short description of the progress of photo-mechanical printing processes in the photographically young country, Japan.



Half-Tone Block by I. TANAKA. W. K. BURTON, C. E.

At present there is practically only one firm in Japan producing half-tone blocks; it is the firm of Mr. K. Ogawa. He brought with him the whole set of apparatus on his return from America from his visit to the Chicago World's Fair. We cannot say his works are very extensive, but, as the first starting in our country, they may be said to be fairly complete. To say nothing of the common implements used in this kind of work, the size of the works may be apprehended by knowing that the set of apparatus is driven by an oil engine of 7 horse-power.

The merit of this process, as compared with the hand-engraving process, is the rapidity of reproduction. The merit has been rapidly appreciated in our country in connection with illustrations of the recent war with China. The scenes from the battle-fields are sent by reporters of newspapers who have been competing with each other to have their illustrations used as soon as possible. And it is by the aid of this ingenious process only that they can have them reproduced. The public appreciating its merit, the use is extending in the illustration of periodicals, books, etc., and the firm above mentioned is doing work, both by day and night.

Mr. Tanaka is an amateur, and does his work for amusement only, but we have his kind promise to produce for ourselves the monthly frontispiece of the *Shashin Shimpo*. He began his experiments by himself only a year ago, making solutions according to formulas that he found in periodicals, and also according to the directions as given by the dealers in the materials. Of course, his work is all done by hand, using no tools beyond a mere hand-saw.

He made some preliminary experiments, but the adjoining block is the first result of systematic work, and may be interesting as showing how ardent study may lead to results, even in the hands of those who have to rely on books entirely for their information.—T. SATO, editor *Shashin Shimpo* (*Japanese Photo News*).

LENSES AND MIRRORS FOR HALF-TONE WORK.

IN a recent publication of his investigations into the theory of the half-tone process, Dr. Eder recommended for the purpose certain series of Goerz, Zeiss and Steinheil lenses. This has caused some comment on the subject of lenses for the half-tone process. Mr. Levy says "the lenses referred to are the very best obtainable for the work, yet the character of the lens within broad limits has been found immaterial," and he "would not consider it advisable to purchase a new lens where one already has a good lens of the rapid rectilinear type, capable of giving a sharp image of the necessary size at an aperture of *F*/12 to *F*/14."

There are some writers with much less practical knowledge of the requirements of the process whose remarks might create the impression that almost any lens is good enough, and who construe Mr. Levy's remarks in relation to the anastigmats, which he pronounces the very best, to indicate that they possess no points of merit over the ordinary rapid rectilinear lens.

A recent article in one of the publications suggests that if the half-tone operator possesses the slightest knowledge of photographic optics, he could be enabled to judge as to the exact requirements. There are many persons possessing more than an elementary knowledge of photographic optics who might go astray in the selection of a lens, from a lack of thorough understanding of the requirements of the process.

One might naturally suppose, on reading many of the articles on the subject, that a lens for this purpose need not give anything like the definition required for line reproduction. This is a mistake made by many from a lack of practical knowledge. I constantly have copy come to my hands for half-tone reproduction that requires the employment of a lens capable of reproducing the most difficult line work.

A few days ago I received a copy, an elaborately executed steel engraving, about 24 x 32 inches, to be reduced one-half. It was a certificate of a secret society, full of fine detail.

The half-tone plate was to be used in advertising the engraving, and, unless the detail was well represented, would be valueless. We made the negative with our No. 8, Series III, Goerz's double anastigmat lens, and obtained a highly satisfactory result.

We frequently receive pen drawings, with some tints in wash, such as charts, etc., requiring the most accurate rendering ; and a lens to be used in reproducing these in half-tone must in no way be inferior to that employed for line reproduction. In my opinion, the requirements in a case of this kind are greater than for ordinary line work, inasmuch as the half-tone necessitates the employment of a sufficiently large diaphragm to give the proper effect. The diaphragm must be larger than for reproducing a photograph. The lights, being equal in the copies, must necessarily be the same in the negatives, but on the photograph we can give a very much longer exposure than on the drawing.

In line production a much smaller diaphragm may be used, and, with proper exposure, an excellent result produced, the same diaphragm resulting in an utter failure of the half-tone negative.

Lenses of comparatively long focus are recognized as the best for screen-work. But the employment of so many variations by different firms in the working of the process render it impossible to say that any particular length of focus is the best. I have used up to 26 inches focus, but find one of 19 inches better adapted to my manner of working. On my own camera I am using a 19-inch, Series III, Goerz's double anastigmat, and we reproduce with it difficult subjects in a more satisfactory manner than with our rapid rectilinear lenses of longer focus.

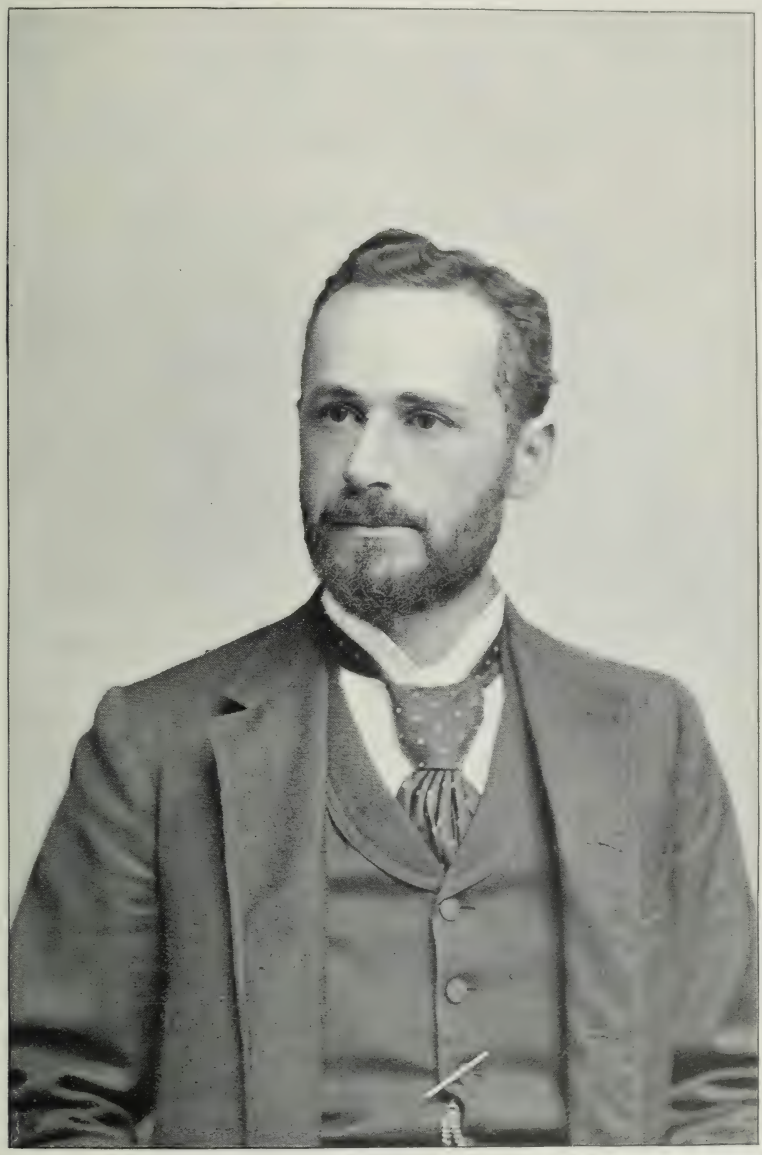
For several years I used an 18-inch rapid rectilinear lens, but to obtain the necessary sharpness on large plates it was always necessary to put on a lens of much longer focus. The annoyance of changing lenses and undertaking large work with one you are not accustomed to working regularly is not to be overlooked.

One should always select a lens capable of executing the most exacting work he can be called upon to do, and when it comes to hand he undertakes it with greater confidence than if compelled to change lenses.

In our half-tone department we have for the past six months used the anastigmats exclusively, and I do not only indorse the statement that the new lenses "are the very best for the work in hand," but unhesitatingly pronounce them far superior in several respects to any other lenses for the purpose.

If one who takes the proper interest in his work should, for a few weeks, work with one of these lenses, he would undoubtedly become dissatisfied with his good old "Antiquity," which has done him good service, and satisfied many operators before him.

Some persons, in considering the purchase of a lens, reckon a prism in their calculations as an absolute necessity, and, where the amount to be expended is limited, the size of the lens selected is sometimes scaled down to an undesirable extent, to bring the total within the limit.



A Portrait Made with Levy's New Four-Line Screen.

While there is no doubt of the desirability of a prism, much of the prejudice against the mirror is due to a lack of knowledge on the subject.

The principal objection to an unvarnished mirror is its liability to tarnish, and, unless varnished in the most careful manner, the sharpness will be seriously interfered with.

A mirror protected with varnish, and placed in the camera (in a projecting box), which is a far more desirable position than before the lens, should last a year or two.

The expense of resilvering is a mere trifle.

I hope to prepare, in time for the next issue, some illustrations demonstrating the practical superiority of the anastigmats.

J. H. Weeks.

A NEW HALF-TONE SCREEN.

The portrait of Mr. Levy, made with a new four-line screen, which we publish this month, will be studied with great interest by process workers. Mr. Levy is constantly experimenting to improve the half-tone screen. It may be remembered that he tried to accomplish this by making the lines in the ordinary screen of alternately varying thicknesses. The results were not entirely satisfactory. The portrait, which we show for the first time, is made with a screen ruled with two lines at right angles to one another, these being crossed with two more lines at angles of 45 degrees, all the lines being the same thickness, and about one hundred and fifty-two to the inch. It will be remarked that this screen gives greater gradation of tones, due to the fact that this screen is made up of two kinds of transparent apertures alternating; one where four lines cross, and the other where but two lines cross. The effect will be seen in the background. There is a large dot, made by the four lines crossing, and an intermediary smaller dot, resulting from the crossing of the two lines. Now, in the highest lights—the collar, for instance—the intermediary dot disappears, leaving the larger dot with good printing quality. This is indeed an advantage. The deeper shadows, however, may clog up with ink in printing, owing to the additional cross hatching, caused by the third and fourth lines, but this can only be known by several trials on the printing press. We shall keep our readers posted on all improvements made in screens, for in this direction there is hope of much progress.

S. H. H.

* * *

John Gast, of Brooklyn, has patented the use of a half-tone screen in which the lines are ruled at right angles on both sides of the same sheet of glass instead of on two glasses, as at present. The effect it is expected to obtain by this arrangement can better be had through the use of a slit diaphragm.

* * *

Great progress is being made on Macfarlane Anderson's new book, "The Photo-Mechanical Processes and Guide to Color Work." All the type work is completed, and it is hoped that the color printing will be satisfactorily done, so that the book may be out this month. The Phasochrom color chart should be of great service.

PROCESS WORK

By Stephen H. Horgan.

"HOW often an idea occurs to one which seems to promise some new thing or new process, and yet, although we mentally make a note of it, we never seem to find the time to carry it out!" So writes Mr. William Gamble in the last number of the *Process Photogram*, and he continues: "Meantime, some one more energetic thinks of the same thing, takes out a patent, and perhaps makes a pile of money out of it. But how many thousands of ideas are there in the world that never have been patented nor used up in any way, very likely having never gone further than the brain of the man who thought them? There they lie dormant, cobwebbed up amongst a lot of other things—a sort of mental junk shop—stored up on that lumber-producing principle that they will come in useful some day. It would be far better to put some of those ideas into circulation. Here are a few random ideas which have occurred to me at various times. I have not had time to make any use of them, so I offer them as exchange for any other useful notions."

Accepting the very generous offer of Mr. Gamble, we reprint his most valuable ideas, taking the liberty of commenting on them and adding, on account of our limited space, but a few "notions," as he requests, which he may term "Yankee notions." Mr. Gamble writes:

"An idea once occurred to me, why not etch celluloid to form relief blocks? The image could be formed in gelatine, and the eating away of the base performed with alcohol-ether. In this connection the Warnerke process tissue suggested itself. The exposed tissue would be transferred to thick celluloid, or xylonite, and the soluble portion washed out. The alcoholic etching fluid would increase the hardness of the resist. The back and margins would, of course, have to be painted with a varnish insoluble in the alcohol-ether mixture."

This would be a slower and more expensive method than the present zinc-etching one.

* * *

"In a perfect collodion negative or transparency a distinct relief is visible, especially if the plate has been intensified. The relief can be increased by repeated intensification. Why not increase the relief by electric deposition of silver until the plate forms a mould for electrotyping?"

Cui bono?

* * *

"Coat a zinc plate with etching ground, and scratch the drawing with an etching needle, or print a negative image from a transparency. Flow the plate with a coppering solution or deposit by battery. Clean off the ground, and etch with weak hydrochloric acid, which will not attack the copper, but will vigorously etch the zinc. It will be necessary to ink with glazed roller when undercutting commences. Another way would be to copper the zinc first, print on it the ordinary positive image, etch away the bare copper with perchloride, and when the zinc is exposed continue etching with weak hydrochloric acid."

This idea, which in theory looks so promising, I have tried, not only by protecting the zinc with a film of metallic copper, but also with metallic platinum as well as with gold. It is not a success, for the reason that the two metals in contact become electrodes, and the etching solution the electrolyte and the most violent electro-chemical action takes place at the edges of the lines, resulting in undercutting without etching between the lines to any appreciable extent.

* * *

"Get some print-out collodion emulsion and coat albumenized glass. Print a good image, then wash the plate and immerse in a strong solution of common salt. Don't fix. Lay the plate on a pad of black velvet and proceed to cut a drawing with a lozenge etching needle ; keep the plate out of strong light and mask as much as possible whilst working. When the scratched drawing is finished, flow the plate with an intensifier, which will turn it into a black and white line negative."

Good idea.

* * *

"Coat a copper plate with thin bitumen, then with print-out collodion emulsion. Treat as described in last paragraph, and, after scratching the drawing, etch to form an intaglio plate."

There is danger of the collodion chipping under the etching needle.

* * *

"Prepare plates of mica with a thick coating of a paste of kaolin and French chalk, with albumen to hold it together, and chloride of ammonium to salt it for sensitizing. After drying, immerse in a 60-grain nitrate of silver bath. Dry in darkness and print under a negative. A visible image will be formed, and the outlines of same are cut down to the mica with an etching point. The plate then forms a mold for stereotyping."

Chalk plates are what the above are called in the United States. They are made by coating pieces of saw steel with precipitated chalk mixed with a solution of gum arabic to the consistency of a batter, and baked. I would suggest spraying the chloride of ammonium with an atomizer on the chalk surface, and following this with nitrate of silver, put on in a similar manner.

* * *

"Why not simplify collotype by using copper plates coating with a whirler, and drying off over a stove, instead of having cumbersome drying oven and glass plates?"

This was invented by the late Mr. T. C. Roche.

* * *

"Will it ever be possible to coat a zinc or copper plate with a solution sufficiently sensitive to allow of its being placed in an enlarging camera behind the ruled screen, and receive the image from an ordinary negative? This might be done by using Warnerke tissue, or something kindred."

This last paragraph reminds me that in 1879 I made half-tones direct from ordinary negatives, on the bichromated albumen or gelatine films, by using the screen in the shape of a detached collodion film between the negative and bichromatized film. The necessary diffraction of the screen apertures can be had by introducing a thin sheet of transparent celluloid between the collodion film screen and the bichromatized film. I used this idea successfully for a long time on the New York *Daily Graphic*.

* * *

I have tried electric and various other means to hasten the operation of etching plates in relief, and am convinced that the quickest method will result from letting the etching solution fall like rain from a height on the plate or plates to be etched. Now, who will devise a means of pumping the etching fluid to a height, so that it can be used over and over again, and also separate the solution while falling, into drops?

* * *

A device that would be very valuable in the lightroom in these days of half-tone is an attachment to a clock that would ring and at the same time cap the lens at the second it was previously set for. This would allow the operator to do other things while he now waits for the exposure to be finished. Who will invent it?

* * *

War Illustrations.—It was our civil war that boomed *Frank Leslie's Illustrated Newspaper* and *Harper's Weekly* into prosperity. English wars have been the mainstay of the *Illustrated London News*. The next war will make fortunes for the illustrated daily newspapers. All the pictures will be made by process, and the best of them in color.

* * *

The illustrations in the *Century Magazine* are worthy of study. They are in advance of any hand-engraved process blocks yet made, and need to be studied through a powerful magnifier. The engravers are, however, overdoing it. Every time they engrave a face they spoil it. No engraver's skill can improve on the texture of half-tone for reproducing the effect of flesh.

* * *

The trades union of Process Engravers in New York purpose to assert themselves in this city during this year. Their first object of attack will be the daily newspapers, where they will be supported, they claim, by the Typographical Union, with whom they are affiliated.

THE THREE-COLOR PROCESS PATENTS.

Dr. Albert, of Munich, was granted a patent in England in 1891, English Patent No. 6,634, in which are the following claims:

Claim 1. Multicolor printing from printing surfaces drawn by means of parallel lines, crossed in such a manner that the direction of the lines for each color varies by an angle of about 30 degrees.

Claim 2. Multicolor printing from color blocks, plates, stones or other printing surfaces, produced by photography by means of screens or tints turned so that the direction of the lines forming the tint for each color varies by an angle of either about 30 degrees or about 60 degrees.

Dr. Albert disposed of his rights to an English firm, who have now brought an action for infringement. The case will be watched with interest in this country as there is a similar patent here, though no fear is felt from it by three-color workers, owing presumably to the knowledge that parallel lines crossed in the manner described were in use by color poster engravers and lithographers for years before the issuance of these patents.

HINTS IN HALF-TONE WORK.

If you are using a short-focus lens try a long focus and see how the improvement will repay you.

Lens and screen must be photographically clean, and it is only when no trace of breath can be seen on either that they can be called so.

Stripped films give a sharper plate than can be obtained by use of a prism.

If you use electric light try diffused or reflected light instead of the direct light on copy.

Exposure through a screen should be four or five times as long as for line work.

Make two negatives in line, intensify one as usual, but use nitrate of lead intensifier on the other and compare results.

Chilled solutions and baths will never work well. Keep the shop, day and night, at 60 or 65 degrees Fahr. for uniform results.

Expose during three-fourths of the exposure with a small square stop for details. Use a middle-sized elliptical stop for one-eighth the exposure and a larger circular stop for the remaining eight, says Mr. C. Ashleigh Snow in *Wilson's Photographic Magazine.*

LITHOGRAPHIC PRINTING FROM ZINC.

Zinc plates are used instead of stone in many large lithographic establishments. Although the handling is different from stone in adaptability, the zinc plate is nearly the latter's equal, writes George Fritz, of the Imperial State Printing Office, Vienna, and he continues: "The zinc plates are no longer used smooth, but are roughened with a sand blast until a fine uniform grain is obtained, when the surface is oxidized by flowing over it, as one would a developer, the following solution:

Concentrated solution of alum	10 parts.
Phosphoric acid	1 part.
Water	10 parts.

The plate is then thoroughly washed and dried, after which it can be sensitized for printing on from a negative, or the greasy ink design may be transferred to it as in lithography, after which it is gummed and etched with a solution of :

Gallic acid	5 parts.
Phosphoric acid	1 part.
Thick gum arabic solution	5 parts.
Water	15 "

This etching fluid is allowed to operate for thirty or forty seconds and then wiped off with a damp sponge When printing on the steam press from zinc plates, from 1 to 2 per cent. of gallic acid should be added to the damping water.

LEMERCIER LITHOGRAPHIC DRAWING INK.

This celebratad ink is composed of the following ingredients, all boiled together :

Yellow wax	4 parts.
Tallow (mutton)	4 "
Marseilles soap	12 "
Shellac	6 "
Lampblack	1 part.

To use: Grind this ink, when cold, in distilled water. It should flow like writing ink from the pen.

The year just closed has been marked by the successful introduction of dry plates for process work.

BICHROMATE POISONING.

It is generally considered, by those who have suffered from bichromate poisoning, that a strong cold solution of the bichromate is less harmful than is a very dilute hot one; that there is less risk, for example, in sensitizing the paper than there is in developing the image with hot water. Opinions are all agreed that the only cure for the disease is to prevent further contact with the salt, and nature will quickly work the cure. As an ameliorative of the intense itching of the affected parts, a lotion containing carbolic acid is recommended. Many years ago we mentioned that a dilute solution of carbolic acid, in spirits of wine, and a little glycerine, was the best allayer of the virulent irritation.—*British Journal of Photography.*

SPECIMENS RECEIVED.

From the Heliochrome Company, of London, come two prints in three colors that show much improvement over their previous work.

The three-color calendars of the Franklin Engraving and Electrotyping Company, Chicago, are indeed beautiful.

Much of the success of the half-tone work in *Munsey's Magazine* is due to the ink used in printing them.

J. Manz & Co., of Chicago, show a relief block border made in imitation of geometric lathe work that would have been impossible but a few years ago.

The Sanders Engraving Co., of St. Louis, send us a handsome and unique calendar. The year 1896 is represented by three portraits, a girl of eighteen, a man of ninety, and a child of six, thus offering the designer an opportunity of displaying three different half-tone cuts.

THE SCIENCE OF TONE-RENDERING IN OPAQUE INK.

(*Continued from page* 378.)

THE sensitive film requires a certain minimum action of light upon it before any developable effect is produced, so that with a very short exposure a deposit will be given on development only in the position where the brightest light has acted, *i. e.*, just opposite the center of each screen opening. A longer exposure will allow the appreciable action to extend further from the center and the dots will be correspondingly larger. On continually increasing the exposure the deposit on development will eventually extend over all that part of the surface that receives any light at all. This may or may not be the whole surface of the negative according to circumstances which will be explained later.

Hence, when the object copied is an evenly bright surface, the dots over the surface of the negative will be larger or smaller according to the duration of the exposure.

Similarly, with a fixed exposure differences in the brightness of the various parts of the copy will produce variations in the sizes of the dots in the corresponding parts of the negative. It is necessary, in practice, to maintain a certain relation between the size of the dot and the brightness of the tone represented.

Principles Governing Manipulations in Block Making.

The chief points for consideration in making the negative are (1) the intensity of light acting at the maximum position; (2) the rate of falling off in intensity as the minimum position is approached; and (3) the necessity for a certain degree of opacity in the extreme margins of the dots.

The investigation of the first point is necessary in order to fix the correct exposure, and the consideration of the second will indicate the proper adjustment of screen and stop aperture. The third point has reference only to certain particular processes employed for block-making.

In this preliminary paper these points will be dealt with only in a general manner.

(1) *Conditions Affecting Intensity of Light at Maximum Position.*

Brightness of copy.
Area of stop.
Amplification of image.
Loss of light by reflection and absorption.
Amount of reduction of illumination due to presence of screen (in cases where some obstruction occurs).

The last condition is the only one calling for special consideration. It must be borne in mind that, as before stated, light travels to any point on the sensitive surface in every direction in which straight lines can be drawn from the point through the stop aperture. The total quantity of light therefore reaching any one point takes the form of a cone having the stop aperture for its base and the point in question for its apex, and this holds good whether the sensitive plate is in the focus of the lens or not.

If the opaque parts of the screen cut any portion of this cone there will be a reduction of the illumination of the point.

In order to determine the conditions under which the screen will intercept some portion of the light traveling towards the maximum point and the amount of loss when any occurs, it will be necessary in each case to consider:

(1) The size and form of the screen opening.

(2) The size and form of a section of the cone of light traveling to the point in question at the position where the screen cuts the cone.

(3) The position of the section of the cone with respect to the screen opening.

The size and form of the screen opening may be readily ascertained by measuring the ruling of the particular screen used.

The section of the cone will have the same shape as the stop aperture. The dimensions are found by dividing the dimensions of the stop aperture by the number of times the distance from the sensitive surface to the stop can be divided by the distance from the sensitive surface to the ruled screen.

In the case now taken, viz., that of the point of maximum light action, the section of the cone will be symmetrically disposed about the screen opening.

If the section of the cone can be wholly contained in the screen opening, there is no interception of light by the screen, and, consequently, no loss. But if there is any overlapping on the part of the cone section, the light is diminished by the proportion the overlapping part of the section bears to the whole section.

The amount of reduction in illumination due to screen when any occurs must be known in order that allowance in exposure may be made for it as well as for variations in stop, focal length and brightness of copy.

Calculations can readily be made with the assistance of enlarged figures of screen and cone section drawn to scale. It will at once be seen whether any part of the cone section overlaps, and if it does the areas of the part overlapping and of the whole section can be measured. The one divided by the other gives the proportionate reduction of light intensity due to the screen.

As an example, the figures resulting from one calculation are given:

Using a circular stop, diameter $\frac{1}{45}$ of the focal length of lens. Screen, 125 lines to the inch. Space, $1\frac{1}{3}$ times the width of the lines.

Distance of screen from plate, .16 inch; no loss of illumination at maximum position.

Distance of screen from plate, .18 inch; no loss of illumination at maximum position.

Distance of screen from plate, .20 inch; no loss of illumination at maximum position.

Distance of screen from plate, .22 inch; loss of 6 per cent. of illumination at maximum position.

Distance of screen from plate, .24 inch; loss of 12 per cent. of illumination at maximum position.

Distance of screen from plate, .26 inch; loss of 23 per cent. of illumination at maximum position.

Distance of screen from plate, .28 inch; loss of 31 per cent. of illumination at maximum position.

Distance of screen from plate, .30 inch; loss of 40 per cent. of illumination at maximum position.

Distance of screen from plate, .32 inch; loss of 47 per cent. of illumination at maximum position.

So that in order to get, under the conditions stated, the same light effect at the maximum position, the exposure with the screen at .32 inch would require to be nearly twice that necessary with the screen at .16 inch.

It should be noticed that if the actual size of stop area is used for calculation, the result will not be absolutely correct, because the light, after passing the stop, has to pass through the back combination of the lens, and in so doing it is condensed and the area of the cone proportionately diminished. As the amount of contraction in size varies with both nature of lens used and distance of back combination from the stop, any calculation of the allowance to be made will be of very limited application, and, in practice, calculations based upon the actual stop area are sufficiently accurate.

The general effect of the contraction is to reduce slightly the obstructing action of the screen.

The importance of determining the intensity of light acting at the maximum position arises from the fact that the correctness of the exposure is to be judged from the appearance of the deposit at this point.

The aim in regulating exposure is to get dots of just sufficient density in the parts of the negative which correspond to such shadows in the subject as have to be represented in the print by a tone slightly lighter than the full black of the printing ink.

The deepest shadows of all may be represented by the unbroken black of the ink, and, therefore, may appear as clear glass in the negative, but any parts required to be a shade lighter must be represented by dots, and the exposure must be at least long enough to give these dots sufficient opacity.

ALEXANDER A. K. TALLENT and
ALFRED W. DOLLOND.

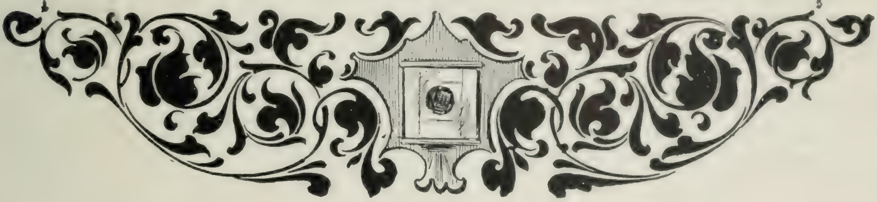
◆

FOR our illustration this month we are indebted to Mr. Henry B. Vanderveer, whose name is very familiar in amateur photographic circles. "Over the Hill" is a picture worthy of study and imitation. The subject is one that at first sight would not seem to possess the elements of an artistic picture, and the exquisite rendering obtained by Mr. Vanderveer evidences a trained head and a trained hand.

◆

ALL communications for the February issue of the BULLETIN must be in our hands on or before January 18th.

SOCIETIES



The Photographers' Association of Michigan.—The first convention of the Photographers' Association of Michigan will be held on January 15th to 17th at Detroit. All exhibits must be sent care Clarence Smith, First Vice-President, to the Art Museum, before January 10th.

* * *

Daguerre Camera Club.—Organized in January, 1895, in New York City. The Club consists of thirty-five active members, and meets on the first and third Fridays of each month. Secretary, H. J. Smith, 152 West 77th street, New York.

* * *

The Art Photographic Exhibition, organized by the "Association Belge de Photographie," has been postponed until March 15, 1896. Entries should be made before February 1st. General Secretary, 97 Avenue Brugmann, Uccle lez-Bruxelles, Belgium.

* * *

Camera Club of Mount Vernon.—Meets on the second Thursday in each month. Has twenty-four members, and recently held an exhibition, at which excellent work was shown. Annual meeting will take place on January 9th, at the President's house.

* * *

Department of Photography of the Brooklyn Institute.—November 22d. The meeting was opened with a little business before the Department, after which the former secretary, Mr. G. W. Hart, gave a very interesting demonstration on the "Development of Plates." The eighth weekly meeting was held on November 29th. This being one of the "lantern-slide nights," a considerable number of slides were exhibited, and Dr. L. E. Meeker, who was invited to act as critic for the evening, gave the members many valuable points on matting and composition. On Friday evening, December 6th, the ninth regular meeting was called to order, and the Department was entertained and instructed by a demonstration of the new Eclectic paper.

The tenth regular meeting was held on December 13th. Mr. Cooper, the former president of the Department, gave the members a very interesting evening with an exhibition of a number of lantern slides, the collection containing a number of slides made nearly ten years ago.

* * *

The Mystic Camera Club.—At the meeting of the Club on December 3d, many slides, the property of Rev. Arthur T. Knapp, of Fall River, were exhibited. They all illustrated Japanese scenery, and were made and colored by Japanese artists. The coloring done by the Japanese excels any that has previously been exhibited before the Club.

On December 17th the Club held its second meeting for December. The first set of lantern slides from the New England Lantern-Slide Exchange for 1896 was exhibited. The slides came from the Maplewood Camera Club, Malden, Mass., a new club in the Exchange. On the whole, they were good, and promised some fine work from that club in the future.

The slides worthy of mention are "Moonlight at Marblehead," and the triple and double exposures.

* * *

CHICAGO SOCIETY OF AMATEUR PHOTOGRAPHERS.—Mr. W. A. Morse has given his society a severe but well-meant talking-to because of the poor work sent in by them for this season's set of slides for the Lantern Slide Interchange. The managers of the Interchange have found fault with many societies and have rejected much of their work, but the Chicago set were very severely dealt with. We trust that the lesson will be taken to heart and result in a higher standard of work. The Chicago society will doubtless retrieve itself next year and head the list.

* * *

THE PLAINFIELD CAMERA CLUB availed themselves of the offer made in these columns, and a demonstration of the matt-surface collodion paper—Aristo-Platino—was made by Messrs. Engels and Becker. This month, the same gentlemen will demonstrate before the Brooklyn Institute, Photographic Section. Secretaries of societies wishing to arrange for such demonstrations should write the BULLETIN.

FROM OVER THE WATER.

NEW YORK is noted as being the leading center for the trade in photographic supplies of every description, while it has the oldest and largest house in this line in the country, that conducted by E. & H. T. Anthony & Company. This was the pioneer house in the art of making photographs in the United States, and has ever taken the lead in the introduction of improvements in the art. The business was founded in 1842 by Mr. E. Anthony, and in 1852 he admitted his brother, Mr. H. T. Anthony, to partnership. The business grew at a rapid ratio, and in 1877 a stock company was formed and duly incorporated, with E. Anthony as president and treasurer; H. T. Anthony, vice-president; V. M. Wilcox, secretary. On the death of the vice-president in 1884, Mr. Wilcox was chosen to fill the vacancy, and R. A. Anthony, a son of E. Anthony, was elected secretary. The honored founder died in 1888, when Mr. Wilcox became president and treasurer; R. A. Anthony, vice-president, and F. A. Anthony, secretary. These are the officers at the present day. The company has a capital of $300,000, and operates factories in Jersey City and Brooklyn, employing a large number of people. In every department and branch of the trade this company steadily maintains the lead, manifesting at all times an enterprising and progressive policy, and have established permanent trade relations in all parts of the world. They manufacture, import and supply everything in photographic materials, chemicals and apparatus. They have many specialties peculiar to their house, among which are the Anthony electric light apparatus, now being used by many of the leading galleries in America, securing by this means the ability to work at any hour, independent of daylight. Their leading specialties in amateur outfits are the Eureka school outfit, the Champion equipment, the O. N. A. equipment, the Victor equipment, the N. P. A. camera, the New York Compact camera, the "Normandie" reversible back camera, Anthony's lantern-slide camera, Anthony's patent triplex tripod. Other specialties are Anthony's new economical developer, Anthony's aristotype toning and fixing solution, Anthony's Climax platinum paper, Anthony's triplexicon magic lantern, E. A. rapid lens, and others, while they handle Dallmeyer's lenses, Blair's cameras, and lead all other houses in extent and variety of styles, adapted to every requirement and at all prices. They are trade agents for the celebrated American Aristo paper, the Climax dry plate, and for the Carbon printing papers of the Autotype Company, London. This company also publish Anthony's Photographic BULLETIN, a monthly magazine, in which the latest developments in photography at home and abroad are accurately described. The field of E. & H. T. Anthony & Company is the world. They manufacture a greater variety of supplies than any of their contemporaries, and enjoy a widespread celebrity on both continents.—*Autotype Notes.*

[illegible]

A PHOTOGRAPHER'S DISPLAY OF ARISTO-PLATINO.

One of four panels at the entrance to gallery

ANTHONY'S

Photographic Bulletin.

EDITORS:

PROF CHARLES F. CHANDLER, PH.D., LL.D.
FREDERICK J. HARRISON.

VOL. XXVII. FEBRUARY, 1896. NO. 2.

METACARBOL—A NEW DEVELOPER.

WITHIN the past few years many products suitable for use as developing agents have been placed at the disposal of the photographer. Some of these have been of sterling merit and are in general use to-day, while others, possessing little to recommend them to the photographer, had but a short existence. Indeed, the popularity of some of those that we still have with us is only maintained by persistent advertising, and we predict that within a few months these will also be relegated to the past. Some two or three that we have in mind certainly do possess developing properties, but the poor quality of work that characterizes many amateur productions can, as often as not, be traced to the use of one of these recently discovered developing agents. Again, some of them have a decided action upon the skin of certain individuals, though it has been claimed that, unless one is predisposed to skin disease, this trouble is not experienced. Be this as it may, it is certain that it is no easy matter to determine who is and who is not predisposed to skin disease, and we ourselves have had many complaints of metol, these complaints in every case having been justified by the facts.

An entirely new developing material is announced, and we have given it a thorough trial. Our experiments have convinced us that this new coal-tar product is likely to supplant its predecessors. This new developing agent rejoices in the name of metacarbol, and pending the granting of patents to the inventor details as to the precise composition and method of manufacture are withheld from us. At this writing, we have a sample of metacarbol before us. It is a finely crystalline substance of a light violet color, possessing a very slight and rather agreeable odor. It is readily soluble in water, and, when mixed for use as a developer, the solution has a decided amber color. We have made trials with metacarbol, mixing it with various well-known

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accelerators, and, while it may be used with the carbonates of soda, potash and lithia, we have obtained the best results by the use of sodium hydrate. A very small quantity of sodium hydrate is used, and the mixture has no action whatever upon the hands. The formula that we have obtained as the result of our experiments is the following :

Metacarbol	25 grains.
Sodium sulphite	130 "
Sodium hydrate	60 "
Water	10 ounces.

The sodium sulphite is first dissolved, then the metacarbol, and finally the sodium hydrate. A developer is thus obtained which will fully develop a properly exposed plate in about one minute. The mixture may be further diluted with water, if desired, but, while we have not heretofore believed in rapid development, we can find nothing about the negatives developed in one minute with this metacarbol developer that the most critical person could find fault with. The negatives are rich, with full detail and ample density, free from all trace of stain or fog, and of good printing quality. The solution may be used repeatedly, and shows no deterioration after long-continued use. After developing some twenty-five negatives, we experienced no trouble whatever from the action of the developer on the hands, and could find no staining action on either hands, clothes or plates. The developer, when made up, keeps well ; indeed, a sample made some five weeks ago shows no change, either in appearance or in behavior. The metacarbol itself is a very stable substance. We feel that the new developer possesses many points that are not found in the coal-tar products hitherto placed at the disposal of the photographer, and that its freedom from tendency to give fogged, weak or too harsh negatives, and from all action on the hands, will result in its extensive use among both amateur and professional photographers.

We hope to write further on this new developer in our next issue.

HOME PHOTOGRAPHY—II.

IN our January issue we pointed out that the photographer could find plenty of scope for his efforts without traveling far from home. Portraiture by daylight was considered at some length, but no mention was made of the use of artificial light as a source of illumination. Gas light, or even lamp light, will answer in cases where flowers or interiors without figures are the subjects being photographed. Indeed, some of the best flower studies that we have seen were made by the aid of an ordinary house lamp. But the source of illumination that offers most attraction to the amateur photographer is, undoubtedly, that produced by the aid of burning magnesium or aluminium. These metals may be used in the form of ribbon or in sheets, burning in air or, better, in oxygen, but the best method is to use them in the form of a fine powder. The simplest means for igniting the powdered metal is perhaps that which is attributed to Dr. Piffard. A piece of gun cotton is pulled out, to form a support for the pulverized metal, and, when ignited, a brilliant flash is obtained, but little residue being left. The various forms of flash lamps furnish a handy method of igniting the powder, though many of these are so constructed that no insignificant quantity of the powder is wasted by missing the flame entirely. A flash lamp, to be really efficient, should consume the whole of the powder blown from the reservoir. Such lamps are made, and, of them, the Pine flash lamp is one that has given us satisfaction, permitting, as it does, of the complete combustion of any given quantity of powder. A word of caution must here be given. Compound flash powders of any make must not be used in flash lamps the principle of which is the blowing of the powder through a flame. Flash-light cartridges, too, furnish a handy method for obtaining illumination in the house. We have recently been using a cartridge which consists of a pyrotechnic mixture wrapped up in an easily inflammable paper. The subject being satisfactorily arranged, the cartridge is untwisted, a light applied to the paper, the lens cap is removed, and the exposure made. With such a cartridge there is time for due deliberation, and no residue, such as a burning box or paper, is left.

Photo by Hugo Erichsen.

THE STORY OF THE BATTLE.

Flash-light portraits are not always successful, and, in the majority of cases, this is due to the fact that the flash is made just above and behind the camera. The result is invariably a flat, lifeless picture. Now, it is an established fact in outdoor photography, never, if avoidable, to photograph an object with the sun directly in front of, or behind, the lens. The same principle holds good in indoor work. To obtain the best results, the light must come from the side, and with the flash-light it is possible to produce results that can only with difficulty be distinguished from properly lighted daylight exposures. The flash may, and should, be fired on the side of the sitter, and the use of a properly placed reflector on the other side will obviate harshness or dense shadows. The direct light must, of course, be screened from the lens, and this is easily done. Another difficulty is the staring effect produced by the desire of the sitter to obey the injunction of the operator to "keep your eyes open." A fair amount of illumination in the room, such as the lighting of the gas or lamps, will do away with much of this trouble, but thorough confidence of the sitter in the result, and a knowledge of just what is going to happen, will help greatly.

A really nervous person will never make a good subject for flash-light work, but with a model familiar with the operator and with the method to be employed really good work may be done. Flash-light photography offers many inducements to the amateur photographer, and much in the way of perfecting it may yet be accomplished. As used at present, a large amount of light is wasted, for but a small quantity of the light produced by the burning powder is really reflected from the subject through the lens to the plate. The powder is fired while in bulk, and the flame is of considerable thickness. Now, flame being opaque, only that portion nearest the sitter is of practical utility, and until some method is devised by which the powder may be used in the form of a thin sheet, suspended and fired, so that practically every grain of powder tells, the waste will continue.

The late H. Fourtier, of Paris, made an exhaustive study of the magnesium flash light, and found that with "from 1 to 4 grams the intensity of the light increases in proportion to the weight of powder employed; from 4 to 8 grams, it decreases slowly, and from 8 to 16 grams, rapidly. To use more is simply loss. The splitting up of the one charge into small charges yields much better results. A charge of 2 grams burned at one time furnishes much less light than two charges of 1 gram each fired simultaneously. A considerable gain in light for a given weight is always obtained when the powder is burned in several small charges. Moreover, in this way the flame thus produced occupies a large space, and the light, being thus spread, the shadows are softer, the subject better modeled, and very remarkable effects may be obtained."

The acetylene light will, in the near future, be available for photographic purposes, and will, we believe, be of such actinic power as to render it comparatively an easy matter to obtain a properly timed exposure in a few seconds. Much, however, in the way of experimenting must be done with the new illuminant. Word of a serious explosion in New Haven has just reached us, but the details are not yet known. Acetylene will undoubtedly play an important part in photography, and the progress made with the new gas should be watched by every progressive photographer. Of course, the light most preferable is that given by the electric arc, and there is every evidence that before long every professional photographer will consider an electric lamp a vital part of his outfit, either as an auxiliary to, or as an absolute substitute for, daylight.

Items of Interest

AT a meeting held in London under the chairmanship of the President of the Royal Photographic Society, it was resolved that: "In recognition of the long and valued services rendered to photography and photographers by the late Mr. Taylor, and as an expression of the esteem in which he was held, a memorial to him shall be established, to which the support of all photographers be invited." Mr. Taylor's services to photography are keenly recognized here, and, when details as to the proposed memorial are arranged, we believe that many American photographers will be glad to join in doing honor to one who has played so great a part in the advancement of their art.

E. Cohen describes in *Zeitschrift für Physikalische Chemie* some interesting experiments showing the action of hydrogen on sensitive gelatine plates. A plate coated with gelatino-bromide of silver emulsion was placed in a dilute soda solution to which a very small quantity of platinic chloride had been added. Into this hydrogen gas was passed, and in from fifteen to twenty hours the plates darkened to an intense black, whether they had been exposed or not.

A solder for aluminium recommended by Mr. Joseph Richards in a paper read before the Franklin Institute consists of 1 part of aluminium, 1 part of 10 per cent. phosphor tin, 11 parts of zinc, and 20 parts of tin.

The *Photographic News* comes to us in its new shape, and while it is certainly a cheap paper for one penny, we would prefer to see it bound together, if only by wire stitching, for we feel that it would thus be made easier to handle. The first number contains many valuable hints and some practical articles by well-known photographic writers.

Perfect composition may be expressed in another way by describing it as the display of perfect taste as regards a picture, this taste embracing choice of subject, the choice of material used in the subject, and the manner in which such material is used. We all know when we like a picture, though we may not be able to say why we like it. Yet it is the composition which gives the picture the ease, grace and centered interest which makes it worth looking at. By knowing something about it, our pleasure in looking at the picture should be increased because our intellect is affected as well as our vision, and instead of becoming cramped by certain restrictions or conditions, our capacity of enjoyment will be enlarged.—H. Foster Newey.

* * *

The Rev. F. C. Lambert, occasional contributor to the Bulletin, writes in the *Photographic News* on "Snow Pictures," and sums up the chief points of importance in this work as follows :

"1. The contrasts (of snow and ordinary dark objects—tree trunks) are very much greater than we are accustomed to at other times of the year.

"2. Contrasts of strong light and dark accentuate each other when in juxtaposition, but at the expense of gradation.

"3. Any great mass of strong dark is not needed ; is often injurious, when in excess, to pictorial effect ; and should usually be connected with the strong light by intermediate tone.

"4. The general effect is more important than any detail quality. This general effect of whiteness and light is best attained by close attention to gradation.

"5. The foreground should receive special attention as regards its arrangement and gradation of lighter tones.

"6. Spottiness or patchiness must be specially guarded against.

"7. Foreground figures, animals, must receive special attention as to local color and surroundings.

"8. Very little (if any) actually white paper (or quite black) is needed or desirable, the chief attention being given to delicacy of gradation at the lighter end of the scale.

"9. Any intricacy of arrangement of darks should be carefully avoided.

"10. The strongest dark should seldom or never be put in the immediate foreground."

* * *

Photographing through opaque substances is the latest newspaper sensation, and, to judge by some American dailies, Prof. Routgen, of the Würzburg University, has devised a method by which a cap on the lens is no obstacle whatever to the successful photographing of the object in front of the lens. Indeed, we are told that not only do fabrics offer no resistance to the passage of light, but that bullets inside a person can be successfully located and photographed ; and all this by means of a vacuum tube. We hope to hear from Prof. Routgen on the subject.

* * *

Lanternists should investigate the merits of the oxyether saturators. The light produced by the aid of one of these instruments is all that can be desired, and the great advantage of only having to carry one gas is not to be overlooked. They are perfectly safe, and are made ready for use by unscrewing the cap and pouring in the ether, replacing the cap and connecting with the oxygen cylinder.

TASTE can be displayed in all branches of photographic work; in fact it is a necessity. Photography is a profession because it cannot be acquired by rule or measure. It is very difficult to examine for proficiency in photography; you may examine in chemistry, optics and mathematics, but the test of a photographer, as of an artist, is the taste and ability displayed in his work. Taste, therefore, is the first and last requisite in a photographer.—JOHN A. RANDALL.

* * *

WITHIN the past few weeks we have had submitted to us for examination some pictures in colors on silk fabrics, which were exquisitely done. They hailed from Paris, and accompanying them was a letter stating that the producer desired to sell the process for making photographs in colors on silk, which process was a direct one, and something very new. Close examination revealed brush marks, and it seems to us highly probable that the silk was locally toned. For example, the reds could be produced by uranium, and the blues and violets by gold baths, etc. We notice in *Photo Chronik* a method of printing on silk which may be of interest to our readers. The silk is washed in warm water and then floated on a solution made as follows:

Salt	10 grains.
Ammonium chloride	10 "
Water	1 ounce.
Ammonia	15 drops.

After floating thereon about two minutes the silk is hung up to dry, and when desired for use is sensitized in a bath of

Silver nitrate	150 grains.
Water	1 ounce.

After floating on this for two minutes it is dried, deeply printed, and toned in an ordinary toning bath, fixed, washed and dried. Such prints can be colored with chalk, by rubbing the chalk well into the silk with a leather stump, and then spraying the silk with a varnish.

* * *

NEWS of the first fatal accident arising from the use of acetylene comes to hand from New Haven, Conn. Three men were killed, and four severely injured as the result of an explosion following experiments with the new illuminant. Fire followed the explosion, and the building was gutted. The entire glass front of the building was blown into the street. Three cylinders of the gas had been procured from New York, and experiments, we understand, were being made with a regulator or governor. The regulator was put on and a test made, the explosion occurring the instant the match was applied. The two other tanks exploded in quick succession.

* * *

THE large edition of the eighth volume of "The International Annual" is nearly closed out. Our readers should all have a copy.

* * *

All matter for the March issue should be in our hands on or before February 15th.

THE INTENSIFICATION OF NEGATIVES.

MANY amateurs do not develop their plates long enough, and the result naturally is a negative that is too thin to be of any use, and that must be intensified in order to give a tolerable print. In common with the rest of my photographic brethren I have the fault above referred to, and therefore often had an opportunity to experiment with intensifiers. I have tried almost every intensifier under the sun, including those which contain lethal poisons, such as cyanide of potassium. After going through the list, I finally settled upon the bichloride of mercury solution, followed by a bath of sulphite of soda. But even this intensifier did not prove satisfactory in all cases, and I was constantly on the lookout for something superior to it. In the September issue of *Der Amateur Photograph*, R. Ed. Liesegang, the celebrated photographic chemist and writer of Düsseldorf, Germany, published an article in which he spoke in glowing terms of an intensifier that has recently attracted much attention in Germany. The strong commendation of this intensifier led me to try it, with the result that I am thoroughly convinced that it is excellent, and just what we all have for a long time been looking for. I recommend it, therefore, unqualifiedly to the photographic fraternity, and presage that they will be delighted with it. The formula, as translated into our weights and measures, is:

SOLUTION No. 1.

Sulphate of copper	75 grains.
Bromide of potassium	75 "
Water	6½ ounces.

SOLUTION No. 2.

Nitrate of silver	91 grains.
Water	4 ounces.

After the negative has been washed for from three to five minutes in running water, so as to remove every trace of hyposulphite of soda, it is placed for ten minutes in solution No. 1, until it has been thoroughly bleached. Right here it might be well to say that the longer the negative is allowed to remain in the whitening solution, the greater will be the resulting density. This part of the process should, therefore, be carefully watched, although, should the intensification be too marked, the density can be reduced with the usual fixing bath of hypo. After being rinsed in running water for five minutes, or washed in five changes of water for ten minutes, the negative is immersed in the nitrate of silver solution until it is thoroughly blackened. On being viewed from the back, no white spots should be visible. Thereupon the negative is washed for at least an hour in frequent changes of water; in running water one-half an hour is sufficient

A negative that has been dried after being fixed is more easily acted upon than one that has just left the washing tank. Light also seems to have an effect upon the process, for it retards it. It is advantageous, therefore, to conduct the intensification in the darkroom or in subdued light.

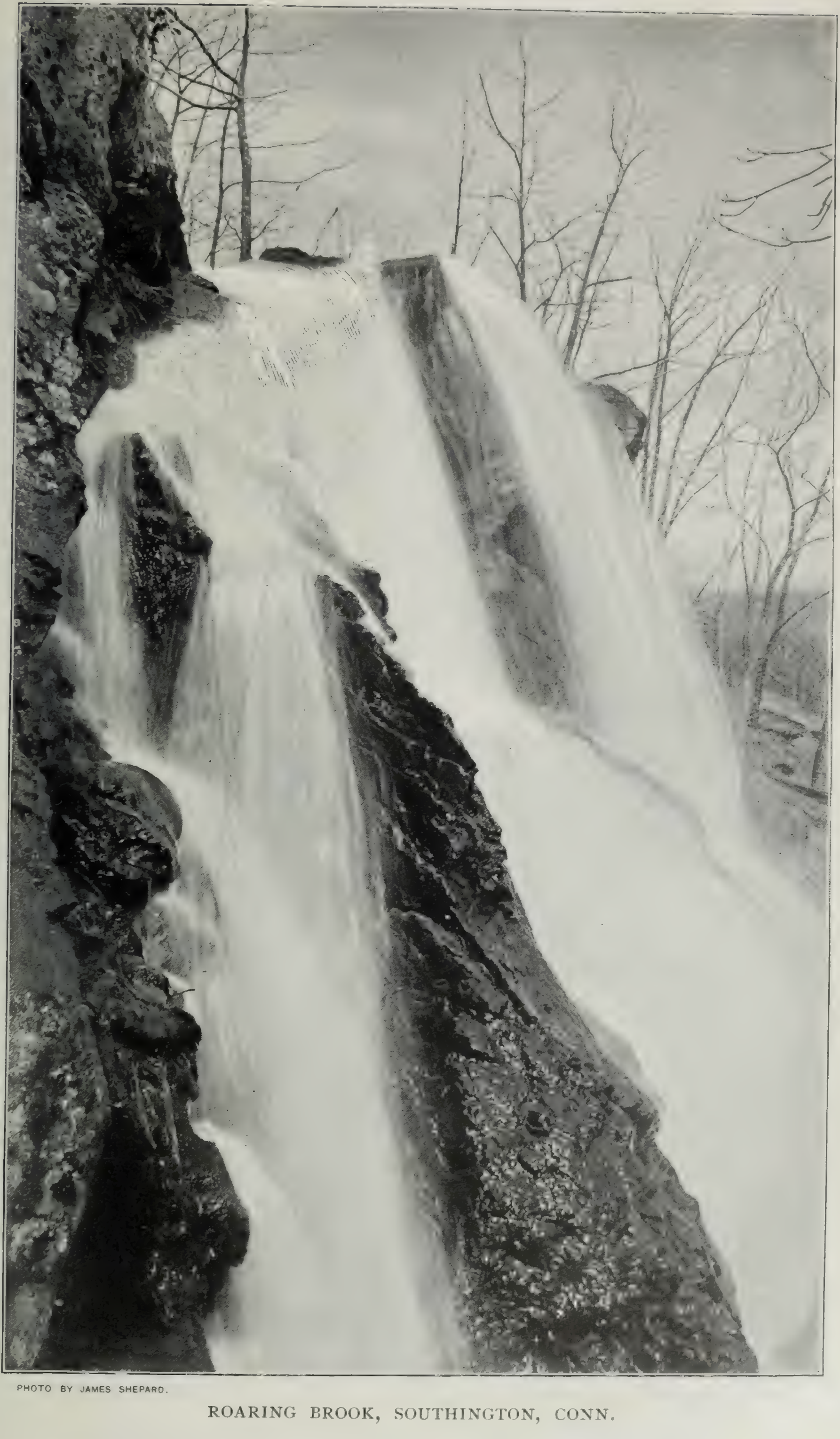

PHOTO BY JAMES SHEPARD.

ROARING BROOK, SOUTHINGTON, CONN.

The intensifier as given above is not a novelty. Edward L. Wilson refers to it in his "Cyclopædic Photography," but omits the details, which may be helpful to photographers. The purpose of this article is to call renewed attention to an intensifier that has been undeservedly neglected.

When I asked a professional photographer the other day which intensifier he was in the habit of using, his reply was: "Never use any. When a plate needs intensification I throw it away and make another exposure." That is all very well, for he confines his business to portraiture; but circumstances may arise, even with him, that may render the employment of an intensifier not only desirable, but imperative.

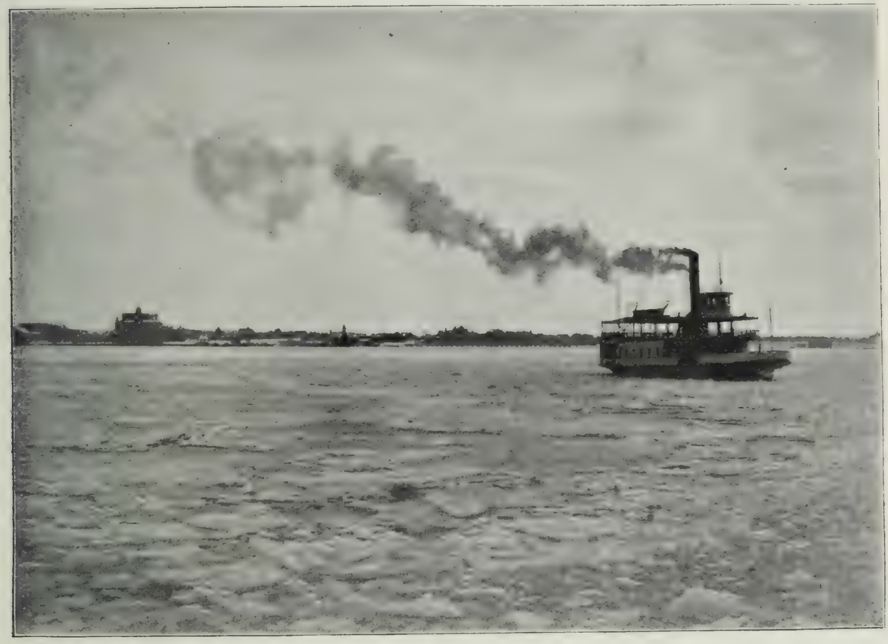

Photo by Hugo Erichsen. THE DETROIT RIVER.

Some day one of his customers may die shortly after being photographed, and our friend may then be compelled to have recourse to the despised intensifier. In the case of landscape photographers, who are often prevented by circumstances from taking the same view twice, the intensifier commends itself.

The picture which accompanies this article shows the ferry-boat *Ariel* crossing the Detroit River from Walkerville, Ontario, which is visible on the other side, to the American shore, on which the picture was taken. The day on which the author photographed the boat was a bitterly cold one, and the cloudy sky threatened snow. As the photograph was an instantaneous one, the result was far from satisfactory until the negative was intensified with the above-mentioned solutions. I trust they will be given a trial by all who are interested in the art-science, and that they may be the means of saving many negatives.

It may interest the readers of the Bulletin to learn that one of our Detroit photographers is successfully using electric light in his studio, both for portraiture and the making of prints. He is now independent of the sun, and work goes right on in his establishment, whether Old Sol is willing or not. His studio is open on three evenings every week, and his nocturnal work is fully equal to that done in broad daylight. His only complaint is that the public does not take readily to the innovation, and must be educated up to it. Those who have tried it, however, are perfectly satisfied, and gradually the prejudice which meets every innovation will be overcome.

Dr. Hugo Erichsen.

THE OLD AND THE NEW.

In looking over the many improvements of the last forty years, how do we find those in photography compare with others?

Emerging from the Daguerreotype, we come to the ambrotype and plain photograph. The former has given way almost entirely to the latter, as, the negative once secured, prints can be made at any future time, though, of course, the ambrotype (or ferrotype, as it is now called, because made on the iron plate) could be finished and delivered on the spot; whereas the photograph must go through the regular course of retouching, printing, toning, fixing, washing, mounting, spotting and rolling. The ferrotype will probably have its advocates for many years to come among those who visit the seashore for the day only, and wish a counterfeit presentment of themselves, including a bit of the ocean or shore. Its cheapness, where only a few pictures are desired, also recommends it. Looking at the quality of the work, is there anything made to-day that shows better likenesses or finer detail than some of the old photographs made on plain paper, before albumenized paper was adapted to photographic purposes? You will find some of these old prints still existing, as clear and brilliant to-day as of yore.

In what, then, consists the improvement in our art? We have albumenized paper, but during its entire existence the journals of photography have teemed with methods for silvering, toning, washing, and hints as to best methods of eliminating the hypo from the prints, to try and make them permanent or nearly so. Look over the old albums and see the array of faded, spotted, yellow pictures there presented. Is it not possible that years hence the same will be the case with the pictures made to-day on the printing-out papers? They are too new to judge of at present.

We have had the carbon paper, which is said to be unalterable and impermeable, with all its variety of tints. As the surface can be finished either glossy or matt, and as the results are unsurpassed, it would seem as if there was a greater future for it than for others of whose keeping qualities we can only surmise. Carbon paper has been in use for nearly forty years, but for a long time the tediousness of the process rendered it impossible to compete in price with the cheaper albumen prints, but the disparity is fast lessening and the process being simplified to such an extent that I should not wonder if at some day not far distant the factories now making printing-out papers would be turning out carbon tissue in place. The future only can tell us. Carbon prints are to be seen to-day that were made thirty years ago, and have lost nothing by age.

We have the dry plates, which from their excess of speed over the wet collodion plates render them a long step ahead of the latter. But are the resulting negatives superior to, if as good as, those that were made by the wet process? There seems to be a coarser grain, and lack of detail that unfits them for the finest process work. For the gallery they are a great convenience, and for viewing a positive necessity, on account of their speed and the number of exposures that can be successively made in a limited period. Their advent has simplified the production of a negative until it is almost mechanical, and the way of the amateur been made so pleasant and easy that many thousands have joined the ranks, and the army is increasing rapidly. As many of the greatest improvements have been made by amateurs, it is possible that some one will come to the front and revolutionize the present methods before another decade. Considerable time and money have been spent towards perfecting color photography, but as yet it seems to be experimental. When the process gets to a point wherein it can be put in the hands of every one, we will call it practical. H. S. NUTT.

TELE-PHOTOGRAPHIC HINTS.

THE following useful hints on the use of the tele-photographic lens are given by Mr. J. H. Dallmeyer, and will be read with interest by those who have a negative element attached to their rapid rectilinear lens:

1. Rigidity of apparatus is a *sine qua non* in tele-photography. This cannot be too often insisted on, as the least tremor in the camera or the tripod stand will be found detrimental to perfect definition, and the greater the magnification, the more will this become evident.*

2. Bear in mind the necessity of extremely accurate focusing, preferably with a focusing glass. The rack and pinion on the lens mount must be utilized for this purpose, but the final adjustment of the focus may be advantageously performed by means of the camera pinion, this acting in the same way as the fine adjustment of a microscope. Always focus with the actual stop used.

3. In Systems I and II the notched-back cell of the portrait lens is adjustable and permits of perfect correction for outstanding spherical aberration (*i. e.*, want of sharpness) for all planes. This back cell should be kept unscrewed for all tele-photographic work. When using the high-power negative, unscrew half a turn; with weaker negatives,

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* In very long extensions of large-sized cameras it is frequently advisable to use a small secondary stand for the support of the front of the apparatus.

one turn to one and a half turns. In portraiture the lens may be used intact.

4. See that your plate-holders are in perfect register.

5. The tele-photographic lens has proved itself of great value, even under adverse atmospheric conditions; but, naturally, if there is time to choose these, the clearer the air, the better. For distant mountain scenery an orange screen may be with advantage employed.

6. The focusing screen itself will readily show whether a given size of plate be covered or not.

7. The increase of exposure as compared with positive lens alone may be found by applying the rules for determining intensity. It is remarkable, however, what little increase will be really found necessary in proportion to the actual intensity ratio. The view ordinarily taken will be that of a distant object, where under-exposure will be the rule to secure the necessary contrast. With a little experience the operator will easily be able to determine for himself the exact amount of exposure necessary.

8. Develop slowly, and use such developers as tend to give great density and clear shadows. Hydroquinone is most useful; but if pyro-ammonia be employed, it is advisable to take an excess of pyro, adding the ammonia gradually. As the best results are obtained by slow development, the plate should be carefully protected from light during the process.

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IRON PROCESSES FOR COPYING DRAWINGS, ETC.

THIS particular branch of photography, viz., the copying of line drawings, etc., may be new to some of you, and, as a considerable portion of my time is occupied with this work, it occurred to me that the subject might interest you. In the first place, I do not prepare my own paper, as it may now be bought so cheaply that it is not worth the trouble. I will, however, as we proceed, give formulas, in order that any one interested may, if they choose, make a few experiments.

There are various ways by which plans, tracings, etc., may be copied, and we will first take the

Ferro-Prussiate Process,

or white lines on blue ground.

The formula for preparing the paper is as follows

A.

Ammonio-citrate of iron	1 part.
Water	5 parts.

B.

Ferricyanide of potassium	1 part.
Water	4 parts.

Mix for use in equal quantities, and spread on good sized paper by means of a sponge or flat camel's-hair brush.

The operations of printing and developing are as simple as any process.

The face of the tracing is placed next the glass of the printing frame, and the prepared paper is then placed face to the back of the drawing, leaving the paper a little larger than the tracing, in order that the action of light may be watched upon the margin; during the printing, the paper assumes various tints from greenish blue to olive, and in summer time a print can be obtained in from five to ten minutes.

When the exposure is complete, the copy to be developed is simply placed in cold water and washed until the lines are pure white ; it is then hung up to dry (bearing in mind that too much washing will reduce the intensity of the blue), and, should a line or figure require adding, it may easily be done by marking on the copy with a solution of soda and water.

The greatest drawbacks to this process are the length of time in printing, and (owing to the ground being blue) the unsuitability for coloring ; but very pleasing pictures may be made from negatives by this process.

I now come to a process which is a great improvement over the last, viz.,

Blue Lines on White Ground,

the formula for which is as follows :

Citric acid	40 grains.
Perchloride of iron	48 "
Gum arabic	42 "
Water	11 ounces.

I have copies by this process, printed no less than sixteen years ago, which are as good now as when first printed, so we may, I think, regard the process as fairly permanent ; the copies are also very suitable for coloring and varnishing.

The prepared paper should be about 1 inch larger than the tracing, to allow for turning up the edges, which I shall explain presently.

The exposure can only be determined by test slips ; these should be placed in the printing frame alongside the tracing to be copied, and should be inserted so as to remain about two-thirds inside and one-third outside the frame ; they can then conveniently be drawn out without opening the frame or disturbing the copy.

After a time one of the test slips is drawn out and dipped in a saturated solution of yellow prussiate of potash, and its chemical action watched for about thirty seconds ; if the background remains perfectly yellow, and the lines come out dark blue, the exposure has been sufficient.

It is not necessary to develop the copies immediately after exposure; the printing may be done while the light is strongest (especially in winter), and development at the close of the day's work, or even the next day.

When the copy is to be developed, place it face downwards on a smooth board, and turn up the edges of the paper about three-quarters of an inch, so as to form a sort of tray, doubling the corners over to prevent the solution from getting on the back, which would cause blue stains ; now float on the prussiate bath for about thirty seconds, seeing that uniform contact takes place while floating on the solution.

Now raise the copy, inclining it to allow the solution to drip off one corner, and notice particularly whether the lines appear to stand in relief ; if they do this, and the ground remains yellow, the development may be considered complete.

The copy is then immersed in clean water, to check the further action of the potash, and then placed face upwards in a bath composed of a 10 per cent. solution of spirits of salts and water, care being taken that the copy is completely covered with the solution. The surface should then be carefully worked over with a camel's-hair brush, to remove the blue deposit.

It is next placed face upwards in an empty tray and well brushed to remove any blue sediment, being brushed copiously with water both back and front, to remove all trace of the acid solution.

Blue stains very often appear on the hands, and may easily be removed by a weak solution of caustic soda.

There is yet another process to which I must draw your attention, and that is Allott & Jones' black line process. The instructions for this process are precisely the same to the end of the prussiate bath, and so for the blue line process.

Immediately upon taking the copy from the prussiate bath, and before washing, float on the bath No. 2 for about five minutes, then drain for another five minutes. Now place the print in a water bath, face upwards, flood it with water, and at the same time sponge the surface, to remove as much of the solution as possible.

Next place it in bath No. 3, face upwards, to bleach. This will take from five to ten minutes. Again flood with water, and transfer the copy to the bath No. 4 to fix the image, leaving it there for five minutes. Again wash, and hang up to dry.

There is still another way of copying drawings, etc., and that is by means of the camera. I have very little to say on this subject, except to give you a formula for development, which I saw mentioned in a photographic journal some years ago. It is about the best I have heard of, and I always use it for this class of work. Take—

Carbonate potassium	360 grains.
Sulphite sodium	360 "
Water	6 ounces.

To each ounce of developer 2 drams of this solution, together with 30 minims of the ordinary 10 per cent. solution of pyro and sulphite are added.

The method of development found to answer best is to soak the plate first of all in a gallic acid solution (2 grains to the ounce) for about half a minute, and then transfer it direct to the developer, where, in about another half a minute, the image begins to appear. Watch carefully, and, when the details in the darkest part of the picture acquire tolerable strength, add 5 minims of a 60-grain bromide solution, and proceed until sufficient density is acquired.

With reference to exposure a few words may be said. Though the use of gallic acid does not necessarily lengthen the exposure required, it has been found better to give more than is necessary; thus, if five seconds be sufficient to produce a perfect image under ordinary circumstances, give ten, or even fifteen; the result will be quicker development and less necessity for forcing, and less chance of fog, etc. Six times the normal exposure has not produced any signs of the plate being overdone; indeed, it seems next to impossible to produce such a result when the gallic acid is employed in the manner described.

Of course, these copies from negatives are best printed in platinotype.

THOS. A. SCOTTON.

CLEANLINESS AND CARE IN LANTERN MATTERS.

THE owner of a lantern should always bear in mind that, inexpensive though his instrument may be, it is none the better for rough handling; on the contrary, it is one of those appliances which demand fair treatment above all things.

A cyclist knows the disadvantage of a dirty chain, and the agony of driving a machine with a wheel-guard choked with mud until it scrapes the tire, but appliances of a more domestic nature are generally quite neglected until they refuse to act any longer. Sash-pulleys become set fast and the cord is allowed to scrape over them until it breaks, locks and latches are frequently worn out before their time through want of oil, clocks and watches are usually considered to be all right until they demonstrate in a more or less unpleasant manner that they are all wrong, and the lantern, that most popular of optical instruments, is too often subject to thoughtless neglect if not ill-usage. Now, the proper care of a lantern involves nothing very laborious or very unpleasant, and such slight pains as may be taken find their reward in the prolonged life of the instrument, for there is very little doubt that in the hands of a careful user a really well-made modern lantern will last practically a lifetime, with a moderate amount of usage. Unless a lantern is always used in the building in which it is kept, it should be provided with a traveling case strongly made of wood, and arranged to fasten so that there is no risk of its opening in transit. The lantern should have as little play as possible in its case, and any fittings which are carried in the same case should be provided with drawers or pockets in which they can be stowed away, and so prevented from injuring any part of the lantern.

It is best to reserve the lantern case exclusively for the lantern and its particular adjuncts, but as a lantern in its case presents many tempting corners in which small articles are sometimes placed to save room elsewhere, it is well to see that such things are stowed so that they cannot do any damage—are packed, in short, instead of being placed in position.

To save time in setting it up, the lantern should go into its case with the condenser, jet, and dissolver (if any) in position, and the condenser should therefore be fitted with a bayonet catch to keep it from falling out of place, and fouling the jet. The jet must also be carefully screwed up on its rod, and the tray must be sufficiently tight in its grooves to keep it from sliding towards the condenser. If the rose top is packed inside the lantern, lower the jet to the bottom of the rod, and turn the nipple end to one side, then push the tray forward until the end of the jet is in the corner at one side of the condenser. Now, there should be plenty of room inside the lantern to stow away the rose top, but on no account omit to place a thick wad of cloth or paper between it and the condenser. One of the most common accidents to happen to a lantern during use is the breakage of the element of the condenser, next the jet. One cause of this is that the lens is cell-bound, that is to say, the edge of the ring which holds the lens has been burnished over in fixing the lens until the latter has become rigidly wedged in place. Burnishing should always cease while the lens has still the least play in its mount. To ascertain whether or not this is so, shake the condenser while held in one hand, when the lens in question may be heard to rattle, or, if not, unscrew the front lens and hold the ring in the left hand. Then try to revolve the lens in its ring with the thumb and two fingers of the right hand. If this can be easily accomplished no anxiety need be felt as to the lens being cell-bound, but, if not, the thin point of a knife blade passed round the circumferences under the thin edge, which is pressing upon the glass, will generally effect what is required. No amount of freedom in the mount, however, will remove the effect of using bad or improper limes, or the result of inattention to the jet.

Exactly where the stream of gas strikes the lime a pit quickly becomes worn, from which the flame rebounds as the pit deepens, especially if the hydrogen is slightly in excess. If a point of flame touches the condenser an immediate fracture is the result.

Many years ago a clockwork train, driven by a powerful spring and known as a lime clock, was used. This was connected to the lime pin, and continuously revolved the lime at a very slow rate. This arrangement, though necessarily somewhat expensive, obviated the necessity of continually turning the lime by hand ; but if from any cause it stopped working and failed to be noticed, the remedy was as bad as the disease. A lime should be turned every minute or two according to its degree of hardness, but only far enough to present a new surface to the stream of gas, so that, when finished, the lime is covered with rows of pits close together. Make a rule of always turning a lime the same way and stick to it, as the greatest danger lies in turning indiscriminately backwards and forwards, for if an old pit were to be brought again into position, the result would most likely be disastrous. Always, then, begin either with a lime down as far as it will go and raise slightly each time, or at its highest position and gradually lower it.

A crack or crevice in the lime will often have the same effect as a pit as regards deflecting the flame, and, although a single straight crack in a lime may easily be dodged, when numerous the best course is to substitute a fresh lime at the earliest opportunity. There is no certainty that a given lime will not crack while in use, but much risk may be removed by warming the lime very gradually. First light the hydrogen and allow a small flame about an inch high to play upon the lime while giving it one or two turns, then gradually increase the hydrogen until it is nearly full on, then open the oxygen tap sufficiently to slightly reduce the flame and leave it so for a minute or two. Then add more oxygen, and, after turning the lime as before, adjust the taps so as to give the best light. A good lime treated in this way at first will rarely crack while in use.

A couple of dusters should always form part of the lantern outfit, as both the lantern and the slides often need dusting, and one duster should be of some fine soft material, which does not leave the slightest deposit behind and should be kept exclusive for wiping the objective and condenser. Light your jet with a taper instead of a match, as, if the audience are in their places, the sudden turning of heads which the striking of a match often causes is apt to make a nervous lanternist go wrong at the start, and heads of matches get dropped into the bottom of the lantern. Probably a little lime dust will get about the lantern, and, although this will not give trouble if kept wiped off the face of the condenser, it is just as well to start with the lantern clean each season. Remove the condenser, jet and tray, and sponge the inside of the lantern carefully with hot water, clean the tray in the same way, and run some hot water through the jet, taking care to dry every part carefully before finishing. The insides of the dome and rose top should also receive attention, and if the instrument is a biunial, take out the plug of the dissolver, clean it thoroughly and put it together again with the slightest smear of vaseline, screwing it up until it will just work easily. It is far better to see to all these little things at home comfortably before the season commences than to have a hitch in the middle of an exhibition, and endure the discomfort of the audience sitting gaping at you while you get flustered in your endeavors to find out what is wrong.

In the case of an oil lantern, always wipe the oil tank perfectly dry everywhere before lighting up, and as soon as the exhibition is over be careful to empty and drain it out. If you do not wish to put the oil back in your oil flask, it is no great waste to throw it down a drain ; at any rate, do not leave it in the lamp on any account, as it is certain to get upset over the bottom of the lantern, and before now I have found it all over the condenser, stage and objective as well.

The screen must also be taken great care of, and not packed near the reading lamp or oil flask, or an oily pattern may be the result next time it is hung up. The screen and slides are best kept apart from the rest of the apparatus, and made into a separate package in order that cleanliness may be insured. A screen should always be used on the same side, the face being kept distinct from the back, and in folding up first fold the top against the bottom with the face inside, then the middle against the top, and so on until it is sufficiently narrow, when it may be folded from side to side. Under this system any dust which may get to the screen is always on the back, and the screen unfolds from side to side first.

The floor or stage where the screen is hung is generally none too clean even in the best regulated halls, and it is not desirable to either unfold or lower the screen upon it. To avoid doing so take a few chairs and place them in a row where the screen is to hang, with their backs alternately one side and the other, and seats about a foot apart. They will then form a species of trough in which the screen may be laid clear of the floor previous to attaching the cords, and into which it may be guided as it is lowered. By this means contact between a spotless screen and a questionable floor may be quite avoided, and the former kept out of the laundry for a surprising length of time.—*The Optical Lantern Journal.*

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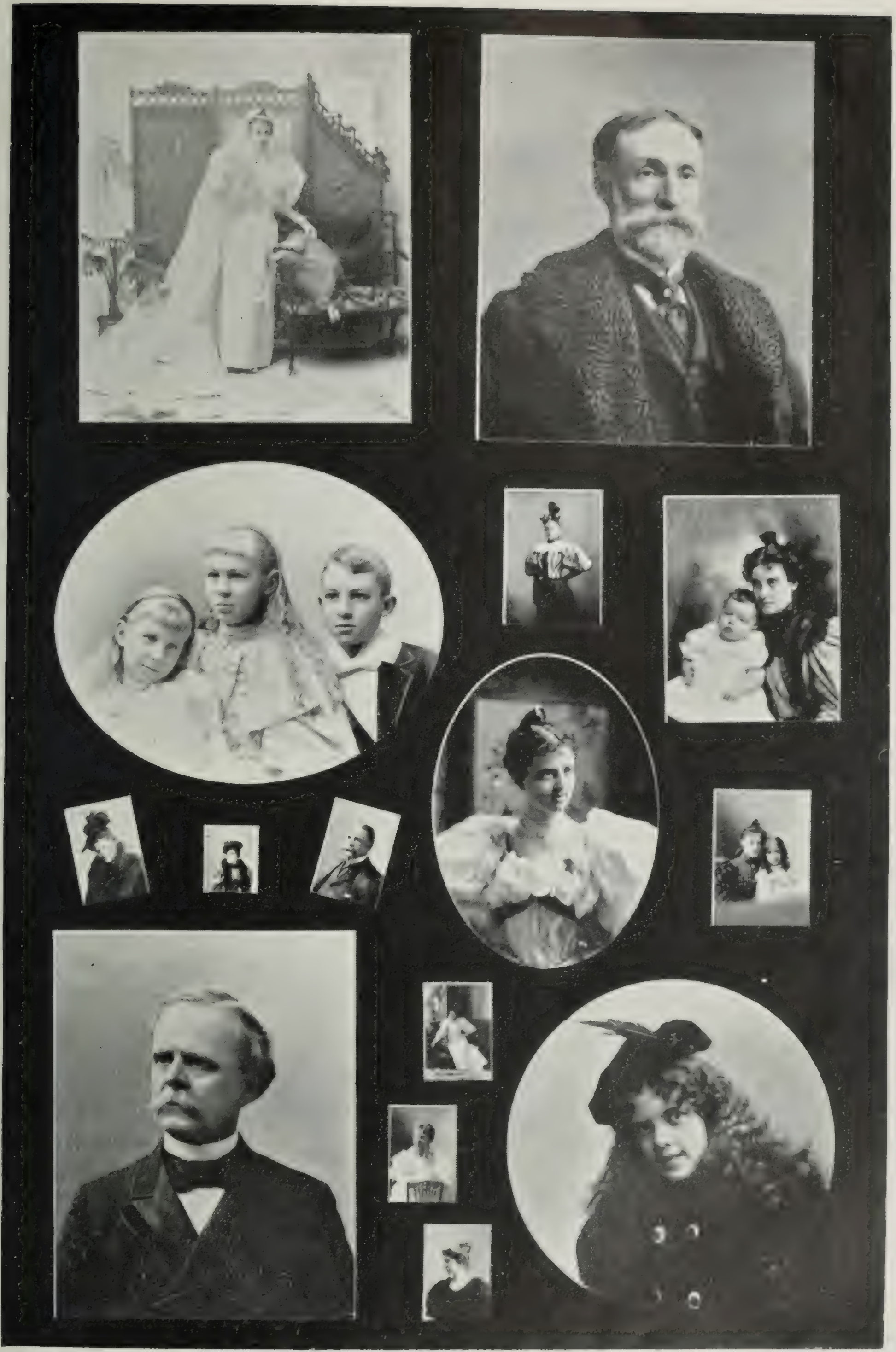
WHILE it is well understood that the beauty of a frame cannot compensate for want of merit in the picture it surrounds, it ought to be equally well understood that a picture, however praiseworthy it may be, cannot have its beauties thrown into prominence by an ugly frame. If the picture and frame are to be considered as one—and they should be—the frame needs to be almost as carefully studied as the composition of the picture, and, like the composition of the picture, it should be designed with "the art that conceals art." The picture, as a whole, is intended to appeal to the æsthetic sense of the observer. It is as great an outrage for the frame to offend that æsthetic sense as for the picture to do so.



PHOTOS BY FREDRICKS, NEW YORK.

A PHOTOGRAPHER'S DISPLAY OF ARISTO-PLATINO.

One of four panels at the entrance to the gallery.

THE EFFECTS OF WINTER.

ALTHOUGH the winters vary from year to year, and sometimes vary very much, the season never passes without giving us experiences of some of its characteristic effects. So far as the photographer's work is concerned, these are chiefly less light and less warmth, and if a good average of work is maintained, these circumstances must be taken into account.

Heat and light are both of them sources of power; they are both forces, and as either diminishes, the effects it produces will diminish too, unless it is allowed to act for a longer time. But it is not always that an increase of time will compensate for a reduction in intensity. If a weight is too heavy for a man to move by pushing it for one minute, he will not move it though he continues his pushing for a year. A feeble force acting for a long time is not always the equivalent of a powerful force acting for a short time, though the energy expended in both cases may be equal. We fear that photographers do not often enough consider the effects of winter. We propose, therefore, to give a cursory glance at some of the chief of them.

Exposures of all sorts are necessarily prolonged. The immediate effect of cold is so slight that practically it may be neglected, but indirectly it may lead to atmospheric conditions that are of great importance. If, for example, the temperature falls when the air is loaded with moisture, the moisture will probably be precipitated as rain or snow, fog or mist. The effect of winter on exposures is, therefore, practically due to diminished light. Other things being equal, exposures for negative-making must be some four or five times as long at noon in December as at noon in midsummer, but the greater prevalence of mist in winter generally renders this increase insufficient.

There are two methods of exposing in photography which are radically different from one another, as we say "by contact," and "in the camera." When the object and the sensitive surface are in contact, there can be no mist between them, then the only effect of a foggy air is to reduce the quantity of light that gains access to the sensitive surface. But when the camera is used, and misty air intervenes between the sensitive surface and the object, we do not merely photograph through a medium that reduces the light, but we photograph the mist as well as the object, and increasing the exposure will not mend matters, for the effect of both will be increased simultaneously. As the light from foggy air is rather bluer than the common daylight, and, as ordinary gelatino-bromide plates are unduly sensitive to blue, the effect of fog on the plate is disproportionately great as compared with its visual effect. By using a yellow screen to reduce or absorb the blue, the effect of fog may be very much diminished whatever plate is employed. But an orthochromatic plate is to be preferred, as with it the exposure will not have to be so prolonged. It is in this way possible to so reduce the effect of mist that the photograph shall show less mistiness than was visible at the time of the exposure, and this possibility may be useful, especially in technical work.

Suppose, however, that the exposure of the plate has been made satisfactorily, a low temperature will very appreciably interfere with its development. It will be longer than usual before the image appears, there will be similar results to those of under-exposure, but there will sometimes be in addition a resulting image so thin as to be almost useless, and which no prolongation of development or additions to the developer will seem able to improve. The best way out of such difficulties is to have the darkroom and all its contents, including the water supply, maintained at a suitable temperature, so that the work may go on all the year round alike. It is obviously of no use to warm the darkroom if the water is drawn direct from a tank that is on the roof, and it is quite possible to warm the room hastily while the developers in stock remain practically unaffected. Everyone has some idea as to how long it takes a bottle of water to get warmed when it is merely put in a warm place; it is not a matter of a few minutes only. Unless care be taken to warm every article and solution used up to the desired temperature, the development will not take place under the same conditions as if it were warmer weather, and the difficulties of the cold will not be got rid of. But this general warming may sometimes be impossible, as when work is urgent, or when there is only a little to be done and the general warming is not worth while. In such cases we have worked successfully with the thermometer only a degree or two above the freezing point, with the aid of nothing extra but a jug of hot water. The developer was mixed so that it was perceptibly warm, say 100 degrees Fahr., and a little hot water was put in the dish to warm it. The dish was emptied, the developer put in, and the plate introduced. The plate being cold and the air nearly at freezing temperature, the developer was down to about 75 degrees Fahr. before the image began to appear, and would sink to several degrees below this before development was complete.

In the cold weather fixing is also slower. The chief danger in this operation is that a sufficient time will not be allowed to elapse after the plate appears to be fixed before it is withdrawn from the bath. Some extra time is always necessary, and it should be proportioned to the time required for the apparent clearing, otherwise the plates may be expected to become stained after a few weeks on account of imperfect fixing.

Washing is also retarded by a low temperature. Under the most suitable circumstances satisfactory washing cannot be accomplished in the few minutes sometimes allotted to it. It is a mistake to suppose that any surface treatment will get over the need for soaking, because it is most important to wash well the part of the film that is least easily got at, and however long this takes in warm weather, it will be more tedious in cold.

And while almost every physical and chemical operation that the photographer is concerned with is rendered slower by cold, the effect of winter does not cease here. Saturated solutions will contain less of the dissolved substances as the temperature sinks. Those, therefore, who keep their hypo as a saturated solution, and dilute it for use, will have their fixing operations slower, not only directly because of the cold, but also because the bath they use will be weaker. The same applies to sodium sulphite when this is used as a saturated solution, and this will almost certainly lead to stains on the plate, because the protracted development requires even more sulphite than usual. Concentrated developers will often deposit crystals in cold weather, and it will be of little use to warm the darkroom, or the dishes, or even the solutions used, if the developer is measured out from a solution that has been weakened by depositing a notable proportion of its constituents. Formulas and directions in general, unless otherwise stated, are intended to be suitable for average temperatures, down to about, perhaps, 50 degrees Fahr. If the temperature of the darkroom is likely to be below this for a few weeks, it is advisable to dilute all concentrated solutions that are likely to be affected. The trouble is not great of adding an equal bulk of water to each, and a note on the label that the preparation is of half-strength.—*Photography.*

JOTTINGS FROM GERMANY.

Yellow Fog.—G. Alpers removes yellow fog easily and surely by treating the well-washed negative with a combined toning and fixing bath and then well washing it again. The negative thus acquires a blue coloration of good actinic value.

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Hypo.—The simplest test for hypo in the last wash water is, according to Professor Böttcher, by the addition of the following solution :

Permanganate of potash	3 grains.
Caustic soda	15 "
Water	16 ounces.

This solution is kept in a glass-stoppered bottle and protected from light. A few drops of the water to be tested are mixed with a few drops of the solution. If hypo is present, the red color will change to green.

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Toning.—Von Hübl makes some pertinent remarks on gold toning. Metallic silver acts as a reducer on the gold salts. If a drop of a chloride of gold solution is placed on a sheet of pure metallic silver, a black spot will ensue, chloride of silver being formed and metallic gold precipitated as a black powder. In just such a manner a chloride of gold solution will act on a silver print.

If a print on chloride of silver paper is freed from silver nitrate by washing, and is then placed in a dilute solution of chloride of gold, it will first assume a red-violet and ultimately a gray-blue coloration. The metallic silver is replaced by gold. But the toning process cannot be carried out in this manner, for the picture, it will be noticed, has become flat, weak and lifeless, the shadows losing their depth. But if the chloride of gold solution is mixed with alkaline bodies, such as soda or borax, it will become colorless after some time, and in this condition will show an essentially different behavior. The washed silver chloride print will, without losing its brilliancy, first assume a dark brown and then a black-violet color.

If such a bath is heated to the boiling point, or if it is left standing for a long time, it will become entirely inactive. It still contains the same quantity of gold, but this is present in a form which cannot even by powerful reducing agents be precipitated.

For the production and use of gold-toning baths the following rules may be observed:

1. The chloride of gold solution must be freed from color by the addition of alkali-acting substances, and is most suitable for the toning process at the moment of the final disappearance of color.

2. Strong alkalies, such as soda, furnish quick-acting baths; weak alkalies, like chalk, give slow-acting baths.

The more alkaline the bath, the quicker will it become useless.

Oil Paintings on Photographs.—Herr Rudolph Rücker recommends for the making of paintings over photographs, that a blue print be made, washed and dried. If this is painted and then immersed in a 2 per cent. aqueous potash solution, the blue picture will disappear, leaving only the painting.

Dr. Julius Schnauss.—One of the oldest photographic authorities in Germany, Dr. Schnauss, is dead. He had reached the sixty-ninth year of his age, and was a much-quoted authority on the chemistry of photography.

Mercury v. Silver in Sensitive Papers.—We clip the following from *Photo Rundschau*: Place a quantity of pure mercury in a dish and cover it with ordinary nitric acid. Allow to stand, at a fairly low temperature, for a few days, when the liquid will be changed to a thick crust of moist crystals, which are then separated from the unchanged mercury and spread out on blotters to dry. They will always be somewhat moist, some nitric acid remaining in the crystals. Dissolve 230 grains of these crystals in 5 ounces of water and add nitric acid, to dissolve any precipitate that may be formed. Take now plain paper and coat this with starch paste, dry it, and float it on the mercury solution prepared as above described. Two to three minutes, in a darkroom or room lighted by candle, will suffice. The paper is dried quickly and kept in a chloride of calcium preserving can until used. The time of printing is short, two to three minutes being sufficient under the ordinary negative The developer is made after the following formula:

Sulphate of iron	65 grains.
Tartaric acid	65 "
Water	10 ounces.

The image appears very rapidly and is fixed in

Common salt	90 grains.
Water	4 ounces.

The picture has a grayish appearance, and, after remaining for five minutes in the salt solution, it is toned in the following platinum bath :

Potassium chloro-platinite	3 grains.
Tartaric acid	60 “
Water	7 ounces.

The result is a fine black tone and a durable picture.

* * *

Yellow Stains.—Negatives which have become stained yellow from development with hydroquinone may be cleared by immersion in the following bath :

Potassium bichromate	10 parts.
Hydrochloric acid	10 “
Water	1,000 “

The negative is left in this solution until it is completely bleached and is then washed well. If it is now developed anew, the negative will be without any trace of fog, and will be intensified if the development is prolonged.

* * *

Bromide of Silver Starch Emulsion.—A patent has recently been granted in Germany for a process for the production of light-sensitive canvas and paper by means of bromide of silver starch emulsion. The specification states that the canvas and paper heretofore prepared with a gelatino-bromide of silver emulsion have a coating of glue which renders painting with oil colors very uncertain, the colors not being able to penetrate to the canvas or paper. Retouching on such papers is also difficult. The object of this invention is to prepare the canvas or paper for better use with oil or water colors, and for that reason a starch paste is employed instead of gelatine. The proportionate quantities used are as follows : Dissolve 20 grams of nitrate of silver in 120 c.c. of distilled water; dissolve also 12½ grams ammonium bromide, 1 gram gelatine, 33 drops of a 10 per cent. solution of iodide of potassium, 20 grams of tartaric acid in 120 c.c. of distilled water over a water bath at 20 degrees R. When all is dissolved, pour the silver solution in small quantities in the bromide solution, and add finally 90 drops of ammonia. Let this emulsion digest in the dark for about an hour. In this condition the emulsion has no setting qualities and is not applicable for photographic purposes. A starch solution is now mixed with it, a little citric acid being added. Arrow-root also gives good results.

The canvas or paper is coated with this emulsion by red light and by the use of a soft sponge. It is then dried, washed for an hour, and dried again. The patent claims are:

1. Process for the production of light-sensitive materials (canvas, paper, etc.) by means of a bromide of silver starch emulsion, which is obtained by mixing a silver bromide emulsion containing very little gelatine with a paste of potato, wheat, or rice-starch, or arrow-root, for use on photographic pictures to be painted in oils or in water colors.

2. The execution of the process as claimed under claim 1, by using a bromide of silver emulsion compounded as described, and mixing same with a cooled-off arrow-root solution produced by boiling arrow-root in citric acid and water.

HENRY DIETRICH.

By Stephen H. Horgan.

MESSRS. GERLACH & BROWN, of St. Louis, request the republication of the formulas for chloride of strontium collodion, with developer and intensifier. We comply, in brief:

Collodion.

Alcohol	8 ounces.
Ether	10 "
Iodide of cadmium	52 grains.
" ammonium	32 "
Chloride of strontium	10 "
" calcium	10 "
Anthony's "red label" cotton	80 "

Developer.

Protosulphate of iron dissolved in water until hydrometer registers 20 to 25 grains.

Acetic acid, 1 ounce to 16 ounces of above iron solution.

Alcohol, quantity sufficient to make developer flow smoothly.

Intensifier.

Sulphate of copper	1 ounce.
Bromide of potassium	¼ "
Water	16 ounces.

Clearing solution, nitric acid, 1 to 10 water.

Blacken with nitrate of silver solution of 20 grains strength or more.

INTENSIFYING HALF-TONE NEGATIVES.

The operation of intensifying the wet-plate negative is thus described by A. H. Calderwood, in *Mosaics:*

"The exposure in the camera and the diaphragm used should be such that the negative after fixing should have the dots in the high lights just nicely knit together at the corners, and the dots in the shadows should be very faint, with just a trace of deposit. The reasons will be apparent further on. After clearing with potassium cyanide and thoroughly washing, the negative is bleached with copper-bromide solution made as follows:

Copper sulphate	40 degrees, hydrometer test.
Potassium bromide	20 " " "

Mix equal parts.

"The negative should now be thoroughly washed; in fact, in this process, this is necessary after the application of every solution.

"It is then flowed over with a strong solution, made strongly acid with nitric acid. An old bath strengthened to about 60 degrees will answer well. Now, on examination with a microscope, you must decide as to further treatment. Sometimes the plate will need nothing further, providing the exposure has been just right, and the right diaphragm has been used. But now the clearing solution comes in play.

"This is made by adding potassium cyanide to a weak solution of iodine in potassium iodide, adding considerably more than is necessary to change the color. Flow this over the plate, being cautious that it goes over in one continuous sweep.

"Watch the result carefully. The high lights gradually open and clear up, and the dots in the shadows lose their fuzziness, becoming sharp and clear. Now flow again with the copper solution, and, after washing, flow with the following:

"Prepare a saturated solution of potassium oxalate, and make it slightly acid with acetic acid. Of this take 4 ounces, and add to it 1 ounce of a saturated solution of sulphate of iron. This blackens the negative beautifully. Another examination should now be made, and if the dots require closing up more in the high lights, or the dots in the shadows need more strengthening, proceed as at first with the copper and silver. Various modifications of the clearing solutions may be made. For instance, a clearing solution very strong in iodine, with barely enough cyanide to clear, will build up the deposit, strengthening the weak dots and bringing together the dots in the high lights. Anyone who has not tried these formulas will be surprised to see what control they give him over the negative. Intensifying over and over again, sometimes six times, will produce a good negative, which, on first examination, might be deemed useless."

ANOTHER HALF-TONE ENAMEL FORMULA.

THE use of gum acacia has been recommended in the half-tone enamel solution. This is suggested by Mr. H. J. Lloyd, of Wyalusing, Pa.:

No. 1.

Le Page's glue	3 ounces.
Albumen	1 ounce.
Water	4 ounces.
Bichromate of ammonium	80 grains.

No. 2.

Gum acacia	½ ounce.
Water	8 ounces,
Aqua ammonia	¼ ounce.

No. 2 solution will keep, while No. 1 will not. For use, mix 3 ounces of No. 1 with 1 ounce of No. 2.

BLOCKING PHOTO-ENGRAVINGS.

Mr. F. J. HENRY, the *Inland Printer's* authority on electrotyping, has this to say to photo-engravers:

"Insufficient attention to the matter of mounting has, I think, caused much of the trouble experienced with half-tones by electrotypers and pressmen. If photo-engravers would exercise more care in the selection of wood for mounting their plates and put half-tones on only well-seasoned, firm, hard wood, they would avoid many of the too common complaints about their work. When a block is too soft to withstand the pressure incident to molding, it is not practicable to make a mold of full depth of the original, and, of course, the electrotyper will be blamed for making a shallow plate. If a half-tone must be mounted before it is sent to be electrotyped, the photo-engraver, for his own good, should see to it that it is put upon a hard block."

VARNISH FOR PLATE-HOLDERS AND CAMERA INTERIORS.

FEW photo-engravers take advantage of the fact that shellac is rendered soluble in water through the agency of borax, and that a varnish made as here described is waterproof when dry.

Bleached shellac	5 ounces.
Borax	1 ounce.
Water	20 ounces.

Digest at nearly boiling point until dissolved ; filter through muslin.

When the woodwork of plate-holders or cameras shows the least signs of being attacked by the silver drippings, the old varnish should be scraped off and new applied, made up with the addition of a little glycerine and aniline black in these proportions :

Shellac	4 ounces.
Borax	1 ounce.
Water	20 ounces.
Glycerine	½ ounce.
Aniline black	2 ounces.

The aniline black need not be added until the shellac is dissolved with the aid of heat. For a dead black stain for camera interiors, to prevent reflections, more aniline black should be added, up to 6 ounces in the above formula. This should give a deep velvety black.

NO SHORT CUT IN ENGRAVING.

"ANYBODY can now make cuts from photos. A little practice makes elegant work. Instructions plain as A B C. Sent to any part of the world for $—." This is a sample of a kind of advertisement that is becoming quite common in our contemporaries. It catches the eye of a photographer and he sends the price of one or two years' subscription to the BULLETIN for the secret, in the expectation of being able to make cuts for the newspapers. He buys a lot of material, tries the process, fails and then writes to the BULLETIN to help him out. We would not use space to notice this matter but for the trouble we are put to answering letters from victims who naturally should write to the "fakir" who sold them the process, but for the fact that they are obliged to enclose a dime or more for an answer from that source.

These processes all amount to the same thing : That you can draw on zinc with a greasy ink, dust the latter with powdered resin, heat and etch with acid. That is all there is to it ; but the literary style of the different process-mongers give a little variety to the otherwise monotonous description. One correspondent sends us the printed description of the process he received, thinking we should publish it and expose the matter. This would do no good. Barnum was an authority on the subject, and I forgot how many fools he had calculated were born every minute.

Here are a few excerpts, however, from the circular. Zinc etchers may be amused at them, but they furnish no fun to the man who pays for them. You are told that "A little practice will learn you to manipulate." "The zinc to use is that commonly kept by tinners to put under stoves." "Shortly after the zinc cut is placed in the acid bath,

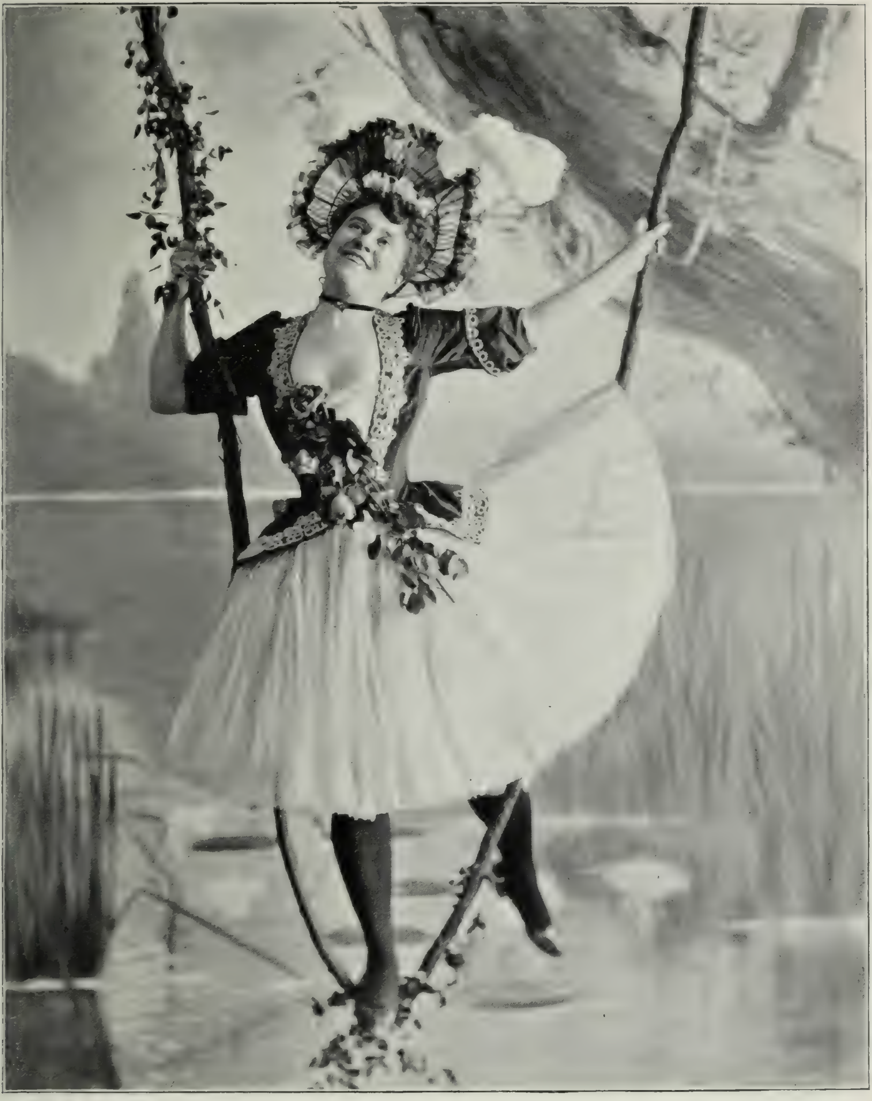

PHOTO BY BAKER ART GALLERY.

FLASH-LIGHT STUDY.

With Williams Flash Machine and Lumino. Background put in on back of negative with Strauss Marl, demonstrating the possibilities of this material in the hands of a competent printer.

small blubbers will form and a slight simmering can be heard by holding your ear close to plate. When the simmering is inaudible with the ear held close to it, it is safe to add a few drops of acid to the bath." There is a new idea. All etchers heretofore judged whether a plate was etching or not by sight. One of our best etchers is deaf; another has most luxuriant whiskers, so neither can use this new wrinkle.

The fact is there is no short cut to the making of good engravings that does not include the camera, and, instead of dispensing with the camera, inventors are striving to utilize it still further in the making of the illustrations of the future, which must in general be better than they are to-day, for we are approaching a time when no crude cuts will be tolerated anywhere.

QUALITY NOT QUANTITY IN HALF-TONE.

To the prediction that half-tone would fall in esteem almost as rapidly as it arose, Mr. J. Gaedicke replies, in *Photographisches Wochenblatt*, "No; by no means, no."

He shows the reasons for the criticism of half-tone, and points out the ways of overcoming these objections. The cheapness and rapidity of the half-tone process has led to excessive application. This brought many in the business, who, entering into a suicidal competition, depreciated prices and sacrificed the quality of the work. Half-tone establishments became mere factories where quantity of production overcame any other consideration. Half-tone, however, can never be other than an artistic production, in which the skilled workman must possess the judgment of an artist. The blame for this degeneration of half-tone Mr. Gaedicke justly lays largely on the publisher, in this way: In looking over the magazines one must characterize them as picture books, and, indeed, so they have become to be regarded by their subscribers. Now the publishers, obliged to fill so much space with pictures, have difficulty in finding suitable originals. Of course, originals can be prepared, but that would take time and additional expense. If the subject has a taking title, or fills a certain space, these are the considerations that chiefly prevail with him; and so the copy is sent to the process man—90 per cent. of it unsuitable for half-tone reproduction—with instructions to rush it, and then, when the work is published, both publisher and public lay the blame for the unfortunate results on the process.

He addresses this warning to managers of illustrated magazines:

First.—Use fewer pictures, and only those possessing artistic value.

Second.—Select only suitable originals.

Third.—Allow the half-tone worker time to produce his work properly.

And to half-tone establishments he advises:

1. Employ men with more artistic discernment.
2. See that your negatives are perfect.
3. Take more time to your work.
4. Produce less, charge more, and let your motto be quality, not quantity.

HALF-TONES ARE REPRODUCTIONS, NOT TRANSLATIONS.

It is to the Christmas number of *The Century Magazine* that one must look for the best representative engraving of the year. Here is what the critical reviewer of *Paper and Press* has to say in favor of half-tone over wood engraving in the Christmas *Century:*

"The attractions within the pages of the *Century* are led by a frontispiece, engraved upon wood by Timothy Cole, after the painting by James Tissot, entitled 'Jesus Found in the Temple.' The exquisite character of Mr. Cole's line-effect, his superb rendering of texture, and the spiritual fire of the interpretation, make the block noteworthy. As a reviewer in *The Nation* remarked not long since, Mr. Cole's effects are his own, and it is questionable whether we are here looking upon that which he conceived Tissot's painting was meant to show, or upon an elaborate fac-simile of the painter's effort. As has been before pointed out, it is an advantage of process to render values approximately to the original, admitting loss of tonality at either end. The question, therefore, arises as to whether this sacrifice of tone values in a process cut is preferable to the sacrifice in an interpretation made by a wood-engraver. It is a point open to considerable dispute. A good comparative opportunity exists in the Tissot plates for the Christmas *Century*, most of which are done in half-tone, with woodcut finish. We confess to a preference for the latter over Mr. Cole's woodcut, simply from the standard of fidelity to originals."

PREPARING STONES FOR PHOTO-LITHOGRAPHY.

In my ten years' experience in making photo-lithographic transfers, complaint was often made that the transfer ink would not leave the transfer paper evenly, or that it would at times appear to have no strength, when transferred to stone, to stand rolling up and etching.

Though no change would be made in the transfer ink, or in the manipulation of the photo-lith. paper, and with great care taken that the transfer would have an ink coating of the same strength, still some lithographers would complain about the transfers, while others would have no trouble with them.

It was one of the mysteries of the business, and now Mr. William J. Kelly, in the *National Lithographer*, gives what may be an explanation of the difficulty. He says that—

"In the process of sand grinding, injury is done to the surface by a portion of the sand entering into and uniting with the stone, hardening the surface, destroying its porosity, making it glassy, and, of course, non-absorbent to the greases used, as tusche, crayon or transfer ink. But in transferring I always distrust the surface and universally apply wet pulverized pumice with a rag to remove all polish and open the pores. This gives the greases in the transfer ink a full opportunity to enter into and be firmly absorbed, and to unite with, and become a part and parcel of, the stone itself by the natural laws of chemistry.

"Please note this fact. Grease entering a stone is no longer there as grease. By chemical affinity the grease is changed into a new character of stone, and the stone is completely changed wherever the grease has entered.

"Well, I am going to suggest a remedy. I have said sand was destructive to the surface of the stone, particularly hard sand. Sand? What is sand? Well, there are sands and sands, and under analytical tests they vary in their component parts as widely as the poles. Silica or quartz won't do. What then? I would suggest that sand be used wherein is contained the same ingredients as the stone itself, or that these ingredients, lime, carbon and magnesia, be mixed with pure silica or quartz and form an artificial lithographic stone mixture.

"I know this—That I have had occasion to transfer the finest kind of rubbed tints—originals on very soft stones, too—and they would transfer as clean, bright and sharp as a new dollar without trouble. Why? I think because, by accident, the originals were grained with yellow sand, which sand was in the nature of the stone itself. This does not mean that yellow sand is always the thing, but I would suggest that sand be used from the Bavarian stone quarries or their immediate vicinity, which would contain some of the ingredients the same as the stone itself."

THE BRITISH JOURNAL ALMANAC FOR 1896.

AMONG the many interesting articles to be found in *The British Journal Almanac for 1896* is an extended one by the late J. Traill Taylor on the wet collodion process, that should be of value to every process worker. What he writes regarding collodionized dry plates, preserved by some organic matter, is of special interest just now. The writer has been all over those experiments in the early days of dry plates, and is still a believer that the perfect dry plate for process work must be made from a collodion emulsion.

PROCESS NOTES.

THE printing ink used on photo-card mounts should contain a few drops of damar varnish and old boiled linseed oil, so as not to come off in burnishing.

* * *

GEORGE H. BENEDICT & COMPANY, of Chicago, find the photo-engraving business so good that they have just occupied another floor in addition to the two they previously had. The three-color half-tone process is now engaging their attention.

* * *

IT is with regret we learn that Mr. Max Levy has been compelled by pre-occupation to cease editing the process-work department of *Paper and Press*. Mr. Levy possesses the valuable trait of not writing without telling something.

REVIEW OF SPECIMENS RECEIVED.

SOME examples of half-tones from the Strand Engraving Company, London, England, are equal in most respects to work done here.

Of The Grand Rapids Engraving Company, of Michigan, it might be said that they have made grand rapid strides to the front rank of engraving companies.

The *New York Herald* has taken a step backward in half-tone work due to their return to the old method of etching half-tones on zinc.

The F. A. Ringler Company is another photo-engraving house whose half-tone work does not appear to keep up with the procession.

Some half-tones by the Binner Engraving Company, of Chicago, show the touch of a master-hand in artistic re-biting.

The Process Photogram contains the portrait of Mr. Max Levy which we published. It is printed on the best paper and with as great care as the British printer can bestow on it, and yet, used as an inserted frontispiece, the result is no better than ours that was printed in our ordinary form with type. As the blocks were equally good, it proves that it is the printer and not the process man in England who needs improve his work.

OBITUARY.

DEATH has again been busy amid the ranks of photographers, and the closing days of the old year and the opening days of the new have witnessed the passing away of men who for more than a quarter of a century have been associated with the advance of photography and photographic appliances.

Washington Irving Adams, President of The Scovill & Adams Company of New York, died at his home in Montclair, N. J., on Wednesday, January 2d. Mr. Adams had been ailing for some time, the effect of a serious paralytic shock experienced some two months previous. He had been identified with photography for thirty-five years, and was prominent in social circles in Montclair.

W. IRVING ADAMS.

Mr. Adams was born in New York City, March 25, 1832, being a descendent of Henry Adams, of Braintree, Mass., from whom the Adamses of Presidential fame were also descended. He was a member of the Society of Colonial Wars, by virtue of descent from Major William Phillips, who commanded the military forces of the Province of Maine in 1665, and was, in addition, a member of the Huguenot Society of America. Mr. Adams was also a Mason, being an honored Past Master of Lafayette Lodge No. 64 of New York. He leaves a widow and one son, Mr. W. I. Lincoln Adams, who has succeeded him in the management of his large business interests. The funeral services were held at "Irvingcroft," Sunday afternoon, January 5th, and the interment was at Rosedale Cemetery, in Montclair.

We extend our earnest and sincere sympathy to the widow and son.

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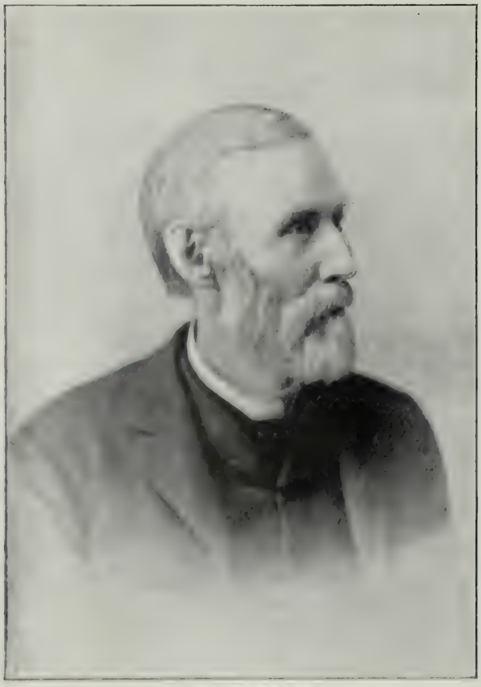
W. D. GATCHEL.

W. D. Gatchel died at Louisville, Ky., December 29, 1895, having reached the ripe age of seventy years. He was, with but few exceptions, the oldest dealer in the States. His first connection with the photographic stock business was as manager for R. B. Appleby, in Chicago. In 1863 he went to Cincinnati, managing the house of L. B. Darling, and in 1868 the firm of Gatchel & Hyatt succeeded L. B. Darling, and in 1870 they opened a branch house in Louisville, Ky., in charge of Mr. Hyatt. In 1873 the above firm succeeded the well-known house of W. H. Tilford, in St. Louis, and the "Tri-City Stock House" was continued until 1881, when Mr. Gatchel took the Cincinnati House and bought out Mr. Hyatt's interest in Louisville. In 1883 Mr. Gatchel sold his Cincinnati business, moving to Louisville, where he founded the house of W. D. Gatchel & Sons. Mr. Gatchel had an enviable reputation for the highest integrity. The business will be continued by his two sons, A. D. and F. E. Gatchel, who have indeed for the past two years practically managed the concern, owing to the failing health of their father.

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Chauncey L. Moore, the well-known photographer of Springfield, Mass., passed away a few weeks ago, death resulting from Bright's disease. Photography loses in Mr. Moore a man who was noted for his evenness of temper and geniality of disposition. He was careful and systematic, and consequently progressive and enterprising. He was one of those big, good-natured men, from whom one expects much, and he did not disappoint those with whom he came in contact. He made friends, kept them, and many to-day mourn his loss. One of his pictures we reproduce.

Photo by C. L. Moore.

THAT'S MY PAPA.

A SIMPLE METHOD OF PROJECTING STEREOSCOPIC PICTURES ON THE SCREEN BY MEANS OF TWO ORDINARY LANTERNS.

I THINK we can fairly claim that my system of getting a stereoscopic effect on the screen has not been shown to an audience before in this country. When we first saw the anaglyphs, the invention of Mr. Ducos du Hauron, we thought that something of the sort might be applied to the lantern, so set to work for that end. I tried a great many different ways, dyed my films in all sorts of colors, red, blue, yellow, used all the various colored gelatines that I could get, had heaps of carbon tissue made in various ways, to try and get the right colors, but with poor success, as you will see. The great difficulty was to get the proper color value in the different pigments that we used, and in the spectacles through which it is necessary to look at the picture. If these pictures could be produced in their proper colors in this way, they would have a much better effect than can be got with a black and white picture colored by means of colored glasses. Gelatines are of no use; you cannot get them of the proper color value; and if you could, they will not stand the heat of the lantern, for in a few seconds they blister up and burn, so I had to fall back to the colored glass. Now, to show this system of stereoscopic projection, as I have said, it is necessary to have two lanterns; either a pair side by side, or a biunial. In the one lantern you place one-half of a stereoscopic picture, and in the other lantern the other half; now, behind one picture you place a red glass, and behind the other picture a green glass. Now, when these two pictures are projected together on the screen, they are made to cover one another, so that we see an indistinct mass of color caused by the two slides occupying the same place on the screen. If the colored glasses are of the right color value, and we cover up the green glass in the left eye, we shall see only one picture, and that all red, though there are still two pictures on the screen ; now cover up the red glass in the right eye and look through the green glass of the left eye and we shall see only one picture, and that will be green, though the red one is still there. Now look at the picture through both eyes of the colored spectacles with a red glass in the right eye and a green glass in the left eye and we shall see that the two pictures that have been projected by the two lanterns on to the screen are made to blend, not only into one another, but to stand out in bold stereoscopic relief.

Let us consider for a moment the cause of this. We have two pictures of the same subject taken with a pair of lenses at 2 or more inches apart, so that one lens takes one picture at one angle, and the other lens at another angle ; now, if we look at the picture so taken through an ordinary stereoscope with prisms, we get one impression, and so see the object photographed as we do in Nature ; just the same with the system that I shall presently show you. If you understand the principle on which this new stereoscopic projection is shown, you will more easily grasp the cause of the effect. As I have said before, we have two similar pictures of the same subject, one taken to the left and the other to the right, these two pictures being covered with colored glasses, one red, the other green—we want to see each separately. In Nature we see more to the left with the left eye, and more to the right with the right eye—we want to see these two pictures as one. To do this, we look at the left picture through a glass of the same color as it is covered by, and the right picture by a colored glass the same color as it is covered by. So we get two pictures conveyed to the eyes separately at the same time, with the result as in Nature, everything standing out in bold relief ; so much so, that in the special stereoscopic pictures that I have prepared to show you this evening, the plants and other things stand out in such bold relief that one feels as if you could put your hand through the leaves and pick the flowers. To get the best effect, the subject should be large, that is to say, when shown on the screen, as near life size as possible. I will show you some interiors—they are so real that you feel as if you must get up and walk down the long corridor, and sit on one of the seats ; I will show you a party of travelers crossing a glacier, with their ladders and ropes—you will see how real it is. In looking at this picture in the flat, you get no idea of the difficult task these men have in hand. I have also two or three copies from an old set of diagrams, published many years ago, for showing objects in true perspective with stereoscopic effect, notably the one of a cross ; if you look at it from one side of the room, you will see the front bar appear as if it stood right out and you could take hold of it with the hand ; walk across to the other side of the room, and the bar will appear to follow you—now this is very curious. Another example : a figure of myself seated in a chair. If this is viewed at an angle, you seem as if you can see almost round the figure. The adaptation of this system has been brought within reach of any exhibitor by Messrs. Newton & Company, of Fleet street, and put upon the market at such a price that I hope we shall soon see it introduced into every public lecture and entertainment. A few pairs of pictures thrown on the screen will give a far better idea of a place than all the description possible, but I will not occupy any more of your time, but at once proceed with the exhibition.

T. E. Freshwater

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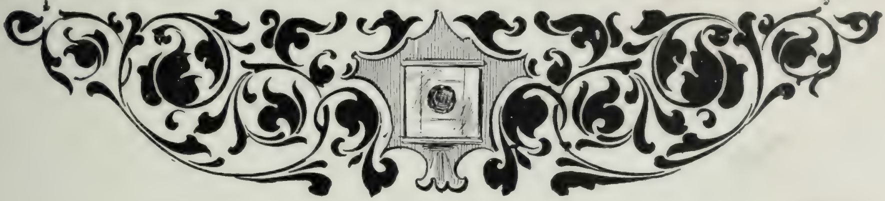
SOCIETIES



Photographers' Association of Iowa.—The Convention of the Photographers Association of Iowa will be held in Des Moines on Tuesday, May 5th, and it is expected that every photographer in Iowa will make an effort to be there. Among the awards offered we are glad to note three prizes for the best exhibits of fifteen photographs from cabinets to 14 x 17, made by flash light. This is another evidence of the slow but steady growth of artificial means of lighting.

The Secretary of the Association is Mr. J. R. Hall, of Monroe, Ia.

* * *

Central Camera Club of Brooklyn.—This club held its fourth annual dinner in the Hotel St. George, Thursday, January 9th. At 8 o'clock the members and guests assembled in the central hall of the Young Men's Christian Association, of which the organization is a part. At the election of officers for the coming year Mr. W. H. Lowery was re-elected President, and the other officers as follows: Mr. H. H. Longstreet, Vice-President; Mr. J. G. McTaggert, Treasurer, and Percy Lathrop, Secretary.

The amateur photographers sat down to the table in the banquet room of the above-named hotel at 9.30, the menu being an excellent one, and a souvenir in the form of a brochure, in which blue prints formed a conspicuous part, was found at each plate. The dinner was followed by an impromptu entertainment, to which all present contributed.

* * *

Department of Photography, Brooklyn Institute.—The twelfth regular meeting of the Society was held on December 27, 1895.

During the evening a large number of lantern slides were exhibited by the members, Mr. G. W. Hart acting as critic for the evening. All slides sent in were without marks of identification, the members voting upon the five best slides, a large amount of very valuable information being gained by all present.

The meeting of January 3d was devoted to a very instructive demonstration of the Aristo-Platino paper by Mr. Pattison, of the American Aristo Paper Company. Before the meeting adjourned Mr. A. G. Tisdell kindly entertained the members with a phonograph.

On January 10th Mr. A. G. Marshall, of Brooklyn, gave a talk on "Color, as Influenced by Light and Atmosphere," the lecture being illustrated with many colored studies in oil showing the same scene under various conditions.

A demonstration of the "Kloro" paper was given on January 17th by the Photo-Materials Company.

The demonstration, and the one of January 3d, were given in the course on "How to Make a Photograph," under the division of "Printing the Picture."

* * *

East Orange Camera Club.—Organized January, 1896. Consists at present of some thirty energetic, enthusiastic men, who will doubtless be heard from in the near future. The Bulletin will be glad to render any assistance to them.

NEW YEAR NOVELTIES.

ARTIFICIAL light is playing so important a part in professional and amateur photographic circles at this time of the year that additions to the means at the disposal of the photographer will be heartily welcome. Bostwick's Perfect Flash Cartridges possess many points of advantage over others, and give a maximum illumination with very little smoke and with no odor whatever. Perhaps the principal advantage is that the cartridge, after burning, leaves no residue. This cartridge consists of a pyrotechnic mixture inside a specially prepared wrapper, which latter is untwisted and ignited. There is no danger with these cartridges if ordinary precautions are taken, for the inflammable wrapper burns sufficiently slowly to enable the operator to act with due deliberation. They are put up in two sizes, known as regular and professional, the latter being about twice the size of the former.

Another item of interest to flash-light photographers is the fact that there is now on the market a product which is free from the danger and odor attending the flash-light mixtures that have hitherto been offered them. Lumino, the new flash powder, is entirely without odor, and gives an enormous amount of light for a very small quantity of powder. It gives very little smoke and very actinic illumination. It is free from all tendency to lumpiness and from the dangers attending all flash mixtures. One advantage that will be greatly appreciated by those who have to work large flash machines is that the flash given with Lumino is practically noiseless. All ordinary powders that have come under our notice, if used in any quantity, give a very loud noise, which has a somewhat startling effect on the sitter and is liable to discompose him somewhat if it is necessary to make more than one flash.

Of particular importance to both amateur and professional photographers is the new non-halation backing known as Anti-Halo. Halation exists in a greater or less degree in every negative whether made in the studio or out of doors. Recent experiments have convinced us that it is impossible with the ordinary plate to obtain the proper amount of detail and freedom from halation even in every-day portraiture. Wherever the high lights are particularly strong there must be a spreading of the light, or in other words a blurring due to the reflection of actinic light from the back of the plate. Anti-Halo is a medium of the proper color to obviate all this trouble, and should be used on all plates, whether intended for portraiture, landscape or interiors. It is very readily applied and dries extremely rapidly. When dry, it cannot be scratched off, but it is easily removed by rinsing under the tap. A convincing test is to coat one-half of the plate with Anti-Halo and make an exposure on some subject with strong contrast. The half that is coated will have ample detail, and possess a degree of sharpness and crispness that is altogether lacking in the uncoated half.

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ANTHONY'S

Photographic Bulletin.

EDITORS:

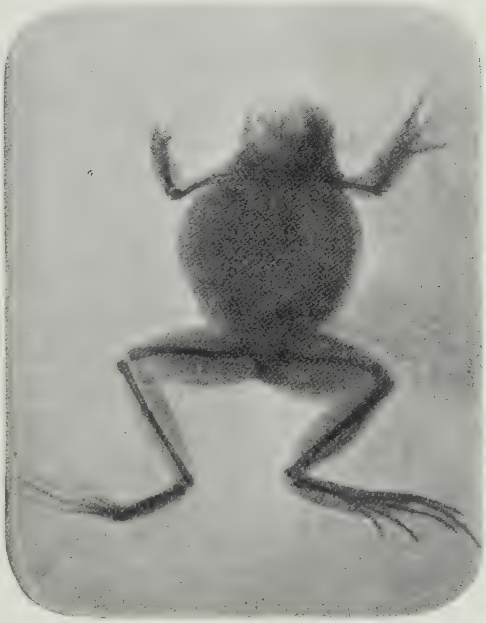
PROF. CHARLES F. CHANDLER, PH.D., LL.D.

FREDERICK J. HARRISON.

VOL. XXVII. MARCH, 1896. NO. 3.

THE NEW PHOTOGRAPHY.

DR. W. C. RÖNTGEN'S announcement that certain substances, hitherto considered to be photographically opaque, are transparent to certain rays, and that this transparency may be demonstrated photographically, has attracted to an unprecedented degree the attention of the lay and scientific press and of the public. The widespread interest evinced by the general public, and the eagerness for details of the methods and for results, are tributes to the power of the cable and newspapers, and indicate a high average of intelligence. Indeed, never before has so much excitement been aroused, and, perhaps, never before has a subject been so intelligently discussed. That the results obtained and the method of obtaining them are truly remarkable every one will concede. True it is that carping critics will urge that this is nothing new, that Lenard and others have suggested somewhat similar methods and accomplished more or less perfect results; but to Professor Röntgen we can safely give the credit of successfully following up the preliminary or accident-



Living Frog Through Sheet of Aluminium. Exposure, Twenty Minutes.
Made by A. C. SWINTON.

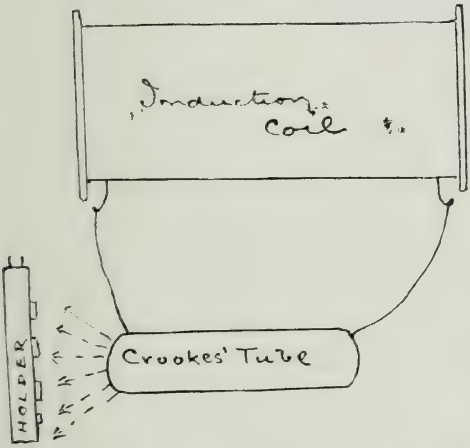
(COPYRIGHT, 1896, BY E. & H. T. ANTHONY & CO.)

ally obtained effects, and for demonstrating, in a practical manner, the method of using the so-called X rays for photographic purposes. Our readers are doubtless familiar with newspaper reports, and comprehend that a Crookes tube is excited electrically, and that from such a tube certain rays proceed that are capable of penetrating wood, ebonite, flesh, and other substances, possessing at the same time the power of affecting sensitive photographic plates in a manner similar to the ordinary light of day.

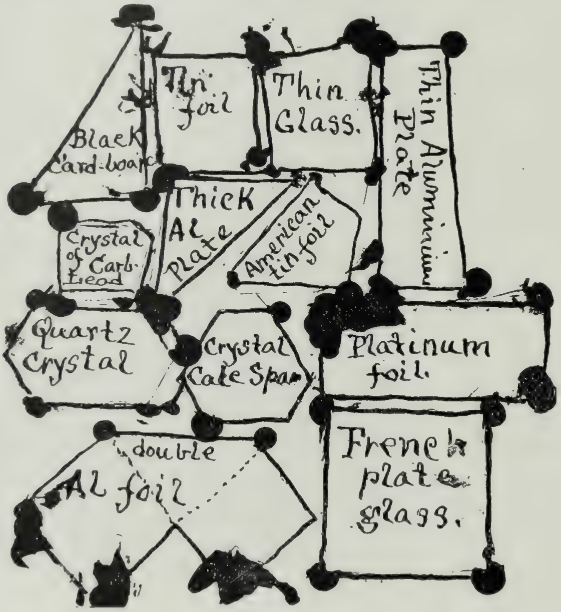
The Crookes tube is a glass tube from which the air has been exhausted to about $\frac{1}{1000000}$ of an atmosphere, and which has sealed near each one of its two ends a platinum wire that can be connected to an induction coil. Many experiments have been made with Crookes tubes, and it has long been known that certain so-called cathode rays, or rays which proceed from the disk of aluminium in the tube connected to the negative pole of the induction coil, possess the power of penetrating many substances, notably aluminium foil. Indeed, Lenard experimented considerably in this direction. Professor Röntgen, however, claims that his rays are entirely distinct from the cathode rays investigated by Lenard, and has named them X rays until such time as their character may be determined. He claims that the X rays are less absorbed by air than the cathode rays, and, further, that they are not acted upon by the magnet, while the action of the magnet on the cathode rays is one of their strongest characteristics. Röntgen claims that the X rays are produced from the cathode rays at the glass surface of the tube, and also that these X rays cannot be reflected, refracted or polarized; and, further, that they have a greater power of penetration. While Lenard's cathode rays fail to pass through anything but the thinnest soap films, thin glass, or aluminium foil, the X rays will traverse a considerable thickness of glass or metal. Professor Röntgen, indeed, succeeded in taking shadowgraphs, as we may call the products of this new photography, at a distance of 200 centimeters from the discharge tube, while the distance of 6 or 8 centimeters sufficed to absorb the Lenard rays. Professor Röntgen claims that the X rays are less diffused than the cathode rays by passing through various substances, such as pine boards, books, etc. So far these rays have only been produced with Crookes tubes at certain degrees of exhaustion, but it is hoped that in the near future other methods of obtaining them may be devised.

Professor Röntgen's experiments have been repeated in Europe and America, particularly in this country by Professor Trowbridge, of Harvard, and Professor Wright, of Yale, some of whose work we are able to reproduce. It is to be feared that many of the attempted repetitions of the experiments made by Professor Röntgen have been performed, not with the X rays, but with ordinary violet light. We recently visited Professor Ogden N. Rood, of Columbia College, and were considerably astonished when he handed us a negative taken by one of his assistants, Mr. Henry S. Curtis, by the aid of ordinary sunlight through a plate-holder provided with an ebonite slide, the exposure being only two hours. Mr. Rittenhouse has also succeeded in obtaining a good impression in two hours with an ebonite plate-holder and the arc light. Only in those cases where there is more than an outline produced can these X rays be presumed to have been responsible for the production of the negative. We reproduce the shadowgraph made by Mr. Curtis, and it will be seen to compare favorably with some of the so-called X ray pictures. Professor Rood's experiments were made with a plate-holder provided with a dense red-brown press-board slide, such as is used in the plate-holders supplied by our publishers. He proved, by an exposure of two hours to a naked arc light, that this slide was opaque to light furnished from the latter source, which, as is well known, is very rich in violet and ultra-violet light. Professor Rood rapidly arranged his apparatus and took one of these shadowgraphs by the aid of the X rays while we waited. The negative was developed by us, and the reproduction of it accompanies the present article. The object of the experiment, and it must be confessed that many of the experiments that are being made throughout the world seem to be without object, was to illustrate the relative transparency of the various substances to these X rays. First, we would remark that Professor Rood's apparatus is extremely simple and does not include anything that could not be easily arranged in any household where an electric current is obtainable. Further, there was no

Effect Obtained with Sunlight through Ebonite Slide.



possibility for the results to be traceable to the violet light, or to any visible light, and the only visible sign of excitation was a slightly greenish tinge in the tube. The ordinary incandescent current was reduced to seven amperes and passed through an induction coil and through the Crookes tube. The plate-holder was placed at one end of the tube, the various substances being held by means of black wax in a little paper tray against the pressboard slide. After an exposure of one hour the plate was developed, and the accompanying half-tone shows the relative transparency of the various materials used to the X rays, the arrangement and thicknesses of the materials used being shown in the zinc etching. In other experiments that we have seen in this direction, an exceptionally powerful current was used with complicated apparatus, Leyden jars, etc., and the tube was heated to a point close to rupture, being intensely bright to the eye. In the experiment described above, conducted by Professor Rood, the temperature of the tube never sensibly exceeded that of the surrounding atmosphere, and the result was all that could be desired ; so that there

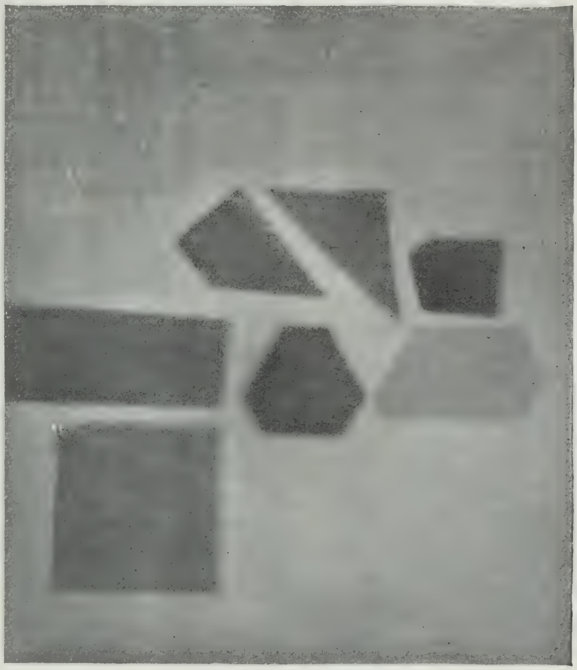


Compare with Half-Tone.

Cardboard, painted black on both sides	.56	millimeter.
Tin foil	.01	"
Thin glass	.19	"
Thin plate of aluminium	.168	"
Crystal of carbonate of lead	4.17	millimeters.
Thick plate of aluminium	2.01	"
American tin foil (mostly lead)	.032	millimeter.
Quartz crystal	.9	"
Crystal of calc spar	2.86	millimeters.
Platinum foil	.02	millimeter.
Thin aluminium foil	.023	"
French plate glass	2.75	millimeters.

is no obstacle in the way of the production of these photographs if one is the possessor of an induction coil and a Crookes tube. We were somewhat amused to notice that in some of his experiments, where a single plate-holder was desirable, Professor Rood was employing a wooden plate-holder, made by our publishers, which had been in his possession more than thirty-five years. The Professor does not anticipate that the gain to surgical science from the use of the X rays will be very great, but their importance in the advancement of science generally can hardly be sufficiently appreciated. He summed up his ideas about the matter by saying that at present nobody knows what the X rays are or anything about them but the few effects which they are known to produce. The generally accepted theory of ordinary light is that it consists of transverse vibrations or of vibrations which are at right angles to the direction in which the light travels. Professor Röntgen considers it highly probable that his X rays consist of longitudinal vibrations of light, or light in which the vibrations take place in the direction in which the light travels.

Professor Arthur W. Wright, of Sloane Physical Laboratory, has kindly sent us prints from negatives made by him, which will not fail to excite considerable interest. It will be noted that in all cases there is evidence here that the X rays have been employed, and that the results obtained cannot be traceable to violet or ultra-violet light. We would express our thanks to Professor Wright for the use of these results. In his letter to us he says: " The plate showing the tools, eye-glasses, pocket lens, etc., is a very good one, and shows about what the process is capable of doing. The handles of the saw and awl are of cherry wood, and appear very transparent, showing the shanks of the tools inside. The little tool-handle at the left is of hard hickory wood, I believe, and the mounting of the pocket lens is ebonite, with thicker pieces at the ends, and brass rivets, which show plainly. The glass shows no focusing effect, and is merely darker in the center because it is thicker there. The other print is of a small rat." This latter print will possess no little interest

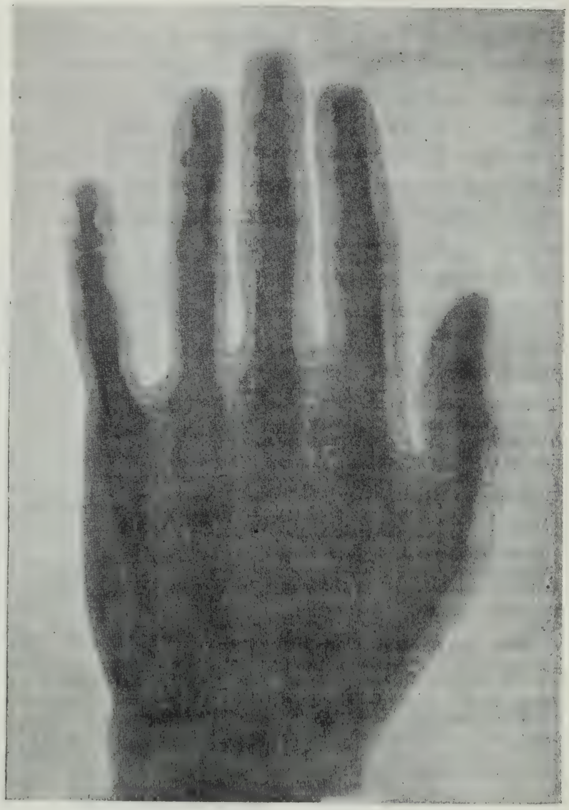


Compare with Zinc Etching.

Made by Prof. Rood.

for our readers, seeing that it shows plainly the bones of the trunk, limbs, and skull.

Mr. Henry A. Bumstead, of New Haven, writes us that the most interesting result of his experiments was the conclusion, also arrived at by Professor Röntgen, that the source of the active rays is at the surface of the tube, and not at the cathode. This was suggested by Professor Hastings from the appearance of several photographs taken with the tube in various positions, before any account of Professor Röntgen's work, which mentions this fact, had appeared in this country. The reproductions of Professor Röntgen's own work will, we think, be of particular interest. These are not made from photographs direct, but are reproduced from half-tones that appeared in the *Photogram*. The photograph of a living human hand, by A. C. Swinton, was made from a negative that was exposed for 20 minutes, through an aluminium sheet of .0075 inch thickness, the Crookes tube being held vertical with its lowest point 2 inches above the center of the hand. With black vulcanized fibre the exposure was reduced to four minutes.



Living Human Hand. Twenty Minutes' Exposure.

Made by A. C. Swinton.

PROFESSOR RÖNTGEN'S DISCOVERY: ON A NEW KIND OF RAYS*

A DISCHARGE from a large induction coil is passed through a Hittorf's vacuum tube, or through a well-exhausted Crookes or Lenard's tube. The tube is surrounded by a fairly close-fitting shield of black paper; it is then possible to see, in a completely darkened room, that paper covered on one side with barium platino-cyanide lights up with brilliant fluorescence when brought into the neighborhood of the tube, whether the painted side or the other be turned towards the tube. The fluorescence is still visible at 2 meters distance. It is easy to show that the origin of the fluorescence lies within the vacuum tube.

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* Translated for *Nature* by Arthur Stanton from the *Sitzungsberichte der Würzburger Physikmedic. Gesellschaft*, 1895.

(2) It is seen, therefore, that some agent is capable of penetrating black cardboard which is quite opaque to ultra-violet light, sunlight, or arc-light. It is, therefore, of interest to investigate how far other bodies can be penetrated by the same agent. It is readily shown that all bodies possess this same transparency, but in varying degrees. For example, paper is very transparent; the fluorescent screen will light up when placed behind a book of a thousand pages; printer's ink offers no marked resistance. Similarly the fluorescence shows behind two packs of cards; a single card does not visibly diminish the brilliancy of the light. So, again, a single thickness of tinfoil hardly casts a shadow on the screen; several have to be superposed to produce a marked effect. Thick blocks of wood are still transparent. Boards of pine 2 or 3 centimeters thick absorb only very little. A piece of sheet aluminium 15 millimeters thick still allowed the X rays (as I will call the rays, for the sake of brevity) to pass, but greatly reduced the fluorescence. Glass plates of similar thickness behave similarly; lead glass is, however, much more opaque than glass free from lead. Ebonite several centimeters thick is transparent. If the hand be held before the fluorescent screen the shadow shows the bones darkly, with only faint outlines of the surrounding tissues.

Water and several other fluids are very transparent. Hydrogen is not markedly more permeable than air. Plates of copper, silver, lead, gold and platinum also allow the rays to pass, but only when the metal is thin. Platinum .2 millimeter thick allows some rays to pass; silver and copper are more transparent. Lead 1.5 millimeters thick is practically opaque. If a square rod of wood 20 millimeters in the side be painted on one face with white lead, it casts little shadow when it is so turned that the painted face is parallel to the X rays, but a strong shadow if the rays have to pass through the painted side. The salts of the metals, either solid or in solution, behave generally as the metals themselves.

(3) The preceding experiments lead to the conclusion that the density of the bodies is the property whose variation mainly affects their permeability. At least no other property seems so marked in this connection. But that the density alone does not determine the transparency is shown by an experiment wherein plates of similar thickness of Iceland spar, glass, aluminium and quartz were employed as screens. Then the Iceland spar showed itself much less transparent than the other bodies, though of approximately the same density. I have not remarked any strong fluorescence of Iceland spar compared with glass (see below, No. 4).

(4) Increasing thickness increases the hindrance offered to the rays by all bodies. A picture has been impressed on a photographic plate of a number of superposed layers of tinfoil, like steps, presenting thus a regularly increasing thickness. This is to be submitted to photometric processes when a suitable instrument is available.

(5) Pieces of platinum, lead, zinc and aluminium foil were so arranged as to produce the same weakening of the effect. The annexed table shows the relative thickness and density of the equivalent sheets of metal:

	Thickness.	Relative thickness.	Density.
Platinum	.018 millimeter	1	21.5
Lead	.050 "	3	11.3
Zinc	.100 "	6	7.1
Aluminium	3.500 millimeters	200	2.6

From these values it is clear that in no case can we obtain the transparency of a body from the product of its density and thickness. The transparency increases much more rapidly than the product decreases.

(6) The fluorescence of barium platinocyanide is not the only noticeable action of the X rays. It is to be observed that other bodies exhibit fluorescence, *e. g.*, calcium sulphide, uranium glass, Iceland spar, rock salt, etc.

Of special interest in this connection is the fact that photographic dry plates are sensitive to the X rays. It is thus possible to exhibit the phenomena so as to exclude the danger of error. I have thus confirmed many observations, originally made by eye observation with the fluorescent screen. Here the power of the X rays to pass through wood or cardboard becomes useful. The photographic plate can be exposed to the action without removal of the shutter of the dark slide or other protecting case, so that the experiment need not be conducted in darkness.

Manifestly, unexposed plates must not be left in their box near the vacuum tube.

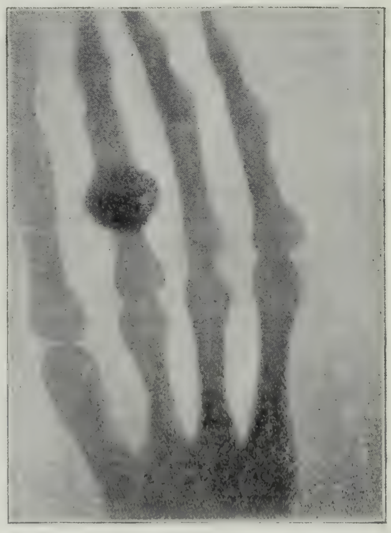
It seems now questionable whether the impression on the plate is a direct effect of the X rays, or a secondary result induced by the fluorescence of the material of the plate. Films can receive the impression as well as ordinary dry plates.

I have not been able to show experimentally that the X rays give rise to any calorific effects. These, however, may be assumed, for the phenomenon of fluorescence shows that the X rays are capable of transformation. It is also certain that all the X rays falling on a body do not leave it as such.

The retina of the eye is quite insensitive to these rays; the eye placed close to the apparatus sees nothing. It is clear from the experiments that this is not due to want of permeability on the part of the structures of the eye.

(7) After my experiments on the transparency of increasing thicknesses of different media, I proceeded to investigate whether the X rays could be deflected by a prism. Investigations with water and carbon bisulphide in mica prisms of 30 degrees showed no deviation, either on the photographic or the fluorescent plate. For comparison, light rays were allowed to fall on the prism as the apparatus was set up for the experiment. They were deviated 10 millimeters and 20 millimeters, respectively, in the case of the two prisms.

With prisms of ebonite and aluminium I have obtained images on the photographic plate which point to a possible deviation. It is, however, uncertain, and at most would point to a refractive index 1.05. No deviation can be observed by means of the fluorescent screen. Investigations with the heavier metals have not as yet led to any result because of their small transparency and the consequent enfeebling of the transmitted rays.

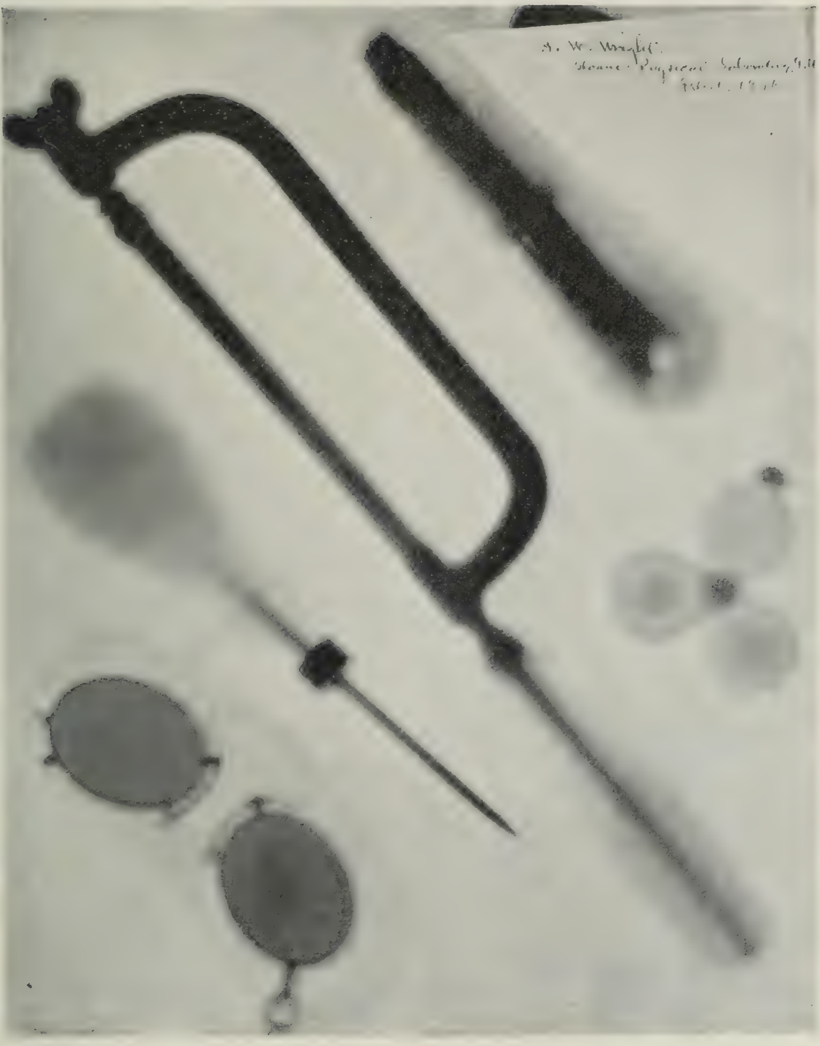


Living Human Hand with Ring on Finger.
Made by W. C. Röntgen.

On account of the importance of the question it is desirable to try in other ways whether the X rays are susceptible of refraction. Finely powdered bodies allow, in thick layers, but little of the incident light to pass through, in consequence of refraction and reflection. In the case of the X rays, however, such layers of powder are for equal masses of substance equally transparent with the coherent solid itself. Hence we cannot conclude any regular reflection or refraction of the X rays. The research was conducted by the aid of finely powdered rock salt, fine electrolytic silver powder, and zinc dust already many times employed in chemical work. In all these cases the result, whether by the fluorescent screen or the photographic method, indicated no difference in transparency between the powder and the coherent solid.

It is, hence, obvious that lenses cannot be looked upon as capable of concentrating the X rays; in effect, both an ebonite and a glass lens of large size proved to be without action. The shadow photograph of a round rod is darker in the middle than at the edge; the image of a cylinder filled with a body more transparent than its walls exhibits the middle brighter than the edge.

(8) The preceding experiments, and others which I pass over, point to the rays being incapable of regular reflection. It is, however, well to detail an observation which at first sight seemed to lead to an opposite conclusion.



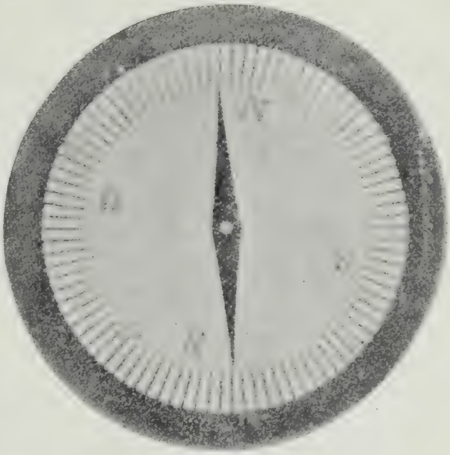
SHOWING GLASSES IN LEATHER CASE, AWL, SAW, AND MAGNIFYING GLASSES.

Made by Prof. A. W. Wright, of Yale, after Rontgen's method.

I exposed a plate, protected by a black paper sheath, to the X rays, so that the glass side lay next to the vacuum tube. The sensitive film was partly covered with star-shaped pieces of platinum, lead, zinc and aluminium. On the developed negative the star-shaped impression showed dark under platinum, lead, and, more markedly, under zinc ; the aluminium gave no image. It seems therefore, that these three metals can reflect the X rays ; as, however, another explanation is possible, I repeated the experiment, with this only difference, that a film of thin aluminium foil was interposd between the sensitive film and the metal stars. Such an aluminium plate is opaque to ultra-violet rays, but transparent to X rays. In the result the images appeared as before, this pointing still to the existence of reflection at metal surfaces.

If one considers this observation in connection with others, namely, on the transparency of powders, and on the state of the surface not being effective in altering the passage of the X rays through a body, it leads to the probable conclusion that regular reflection does not exist, but that bodies behave to the X rays as turbid media to light.

Since I have obtained no evidence of refraction at the surface of different media, it seems probable that the X rays move with the same velocity in all bodies, and in a medium which penetrates everything, and in which the molecules of bodies are embedded. The molecules obstruct the X rays the more effectively as the density of the body concerned is greater.



Compass Card and Needle in Metal Case. Made by W. C. Röntgen.

(9) It seemed possible that the geometrical arrangement of the molecules might affect the action of a body upon the X rays, so that, for example, Iceland spar might exhibit different phenomena according to the relation of the surface of the plate to the axis of the crystal. Experiments with quartz and Iceland spar on this point lead to a negative result.

(10) It is known that Lenard, in his investigations on cathode rays, has shown that they belong to the ether, and can pass through all bodies. Concerning the X rays the same may be said.

In his latest work Lenard has investigated the absorption coefficients of various bodies for the cathode rays, including air at atmospheric pressure, which gives 4.10, 3.40, 3.10 for 1 centimeter, according to the degree of exhaustion of the gas in discharge tube. To judge from the nature of the discharge, I have worked at about the same pressure, but occasionally at greater or smaller pressures. I find, using a Webber's photometer, that the intensity of the fluorescent light varies nearly as the inverse square of the distance between screen and discharge tube. This result is obtained from three very consistent sets of observations at distances of 100 and 200 millimeters. Hence, air absorbs the X rays much less than the cathode rays. This result is in complete agreement with the previously described result, that the fluorescence of the screen can be still observed at 2 meters from the vacuum tube. In general, other bodies behave like air; they are more transparent for the X rays than for the cathode rays.

(11) A further distinction, and a noteworthy one, results from the action of a magnet. I have not succeeded in observing any deviation of the X rays even in very strong magnetic fields.

The deviation of cathode rays by the magnet is one of their peculiar characteristics; it has been observed by Hertz and Lenard, that several kinds of cathode rays exist which differ by their power of exciting phosphorescence, their susceptibility of absorption, and their deviation by the magnet, but a notable deviation has been observed in all cases which have yet been investigated, and I think that such deviation affords a characteristic not to be set aside lightly.

(12) As the result of many researches, it appears that the place of most brilliant phosphorescence of the walls of the discharge tube is the chief seat whence the X rays originate and spread in all directions ; that is, the X rays proceed from the front where the cathode rays strike the glass. If one deviates the cathode rays within the tube by means of a magnet, it is seen that the X rays proceed from a new point, *i. e.*, again from the end of the cathode rays.

Also for this reason the X rays, which are not deflected by a magnet, cannot be regarded as cathode rays which have passed through the glass, for that passage cannot, according to Lenard, be the cause of the different deflection of the rays. Hence I conclude that the X rays are not identical with the cathode rays, but are produced from the cathode rays at the glass surface of the tube.

(13) The rays are generated not only in glass. I have obtained them in an apparatus closed by an aluminium plate 2 millimeters thick. I purpose later to investigate the behavior of other substances.

(14) The justification of the term "rays," applied to the phenomena, lies partly in the regular shadow pictures produced by the interposition of a more or less permeable body between the source and a photographic plate or fluorescence screen.

I have observed and photographed many such shadow pictures. Thus, I have an outline of part of a door covered with lead paint ; the image was produced by placing the discharge tube on one side of the door, and the sensitive plate on the other. I have also a shadow of the bones of the hand, of a wire wound upon a bobbin, of a set of weights in a box, of a compass card and needle completely enclosed in a metal case, of a piece of metal where the X rays show the want of homogeneity, and of other things.

For the rectilinear propagation of the rays, I have a pinhole photograph of the discharge apparatus covered with black paper. It is faint, but unmistakable.

(15) I have sought for interference effects of the X rays, but, possibly in consequence of their small intensity, without result.

(16) Researches to investigate whether electrostatic forces act on the X rays are begun, but not yet concluded.

(17) If one ask, what, then, are these X rays; since they are not cathode rays, one might suppose, from their power of exciting fluorescence and chemical action, them to be due to ultra-violet light? In opposition to this view, a weighty set of considerations presents itself. If X rays be indeed ultra-violet light, then that light must possess the following properties :

(*a*) It is not refracted in passing from air into water, carbon bisulphide, aluminium, rock salt, glass, or zinc.

(*b*) It is incapable of regular reflection at the surfaces of the above bodies.

(*c*) It cannot be polarized by any ordinary polarizing media.

(*d*) The absorption by various bodies must depend chiefly on their density.

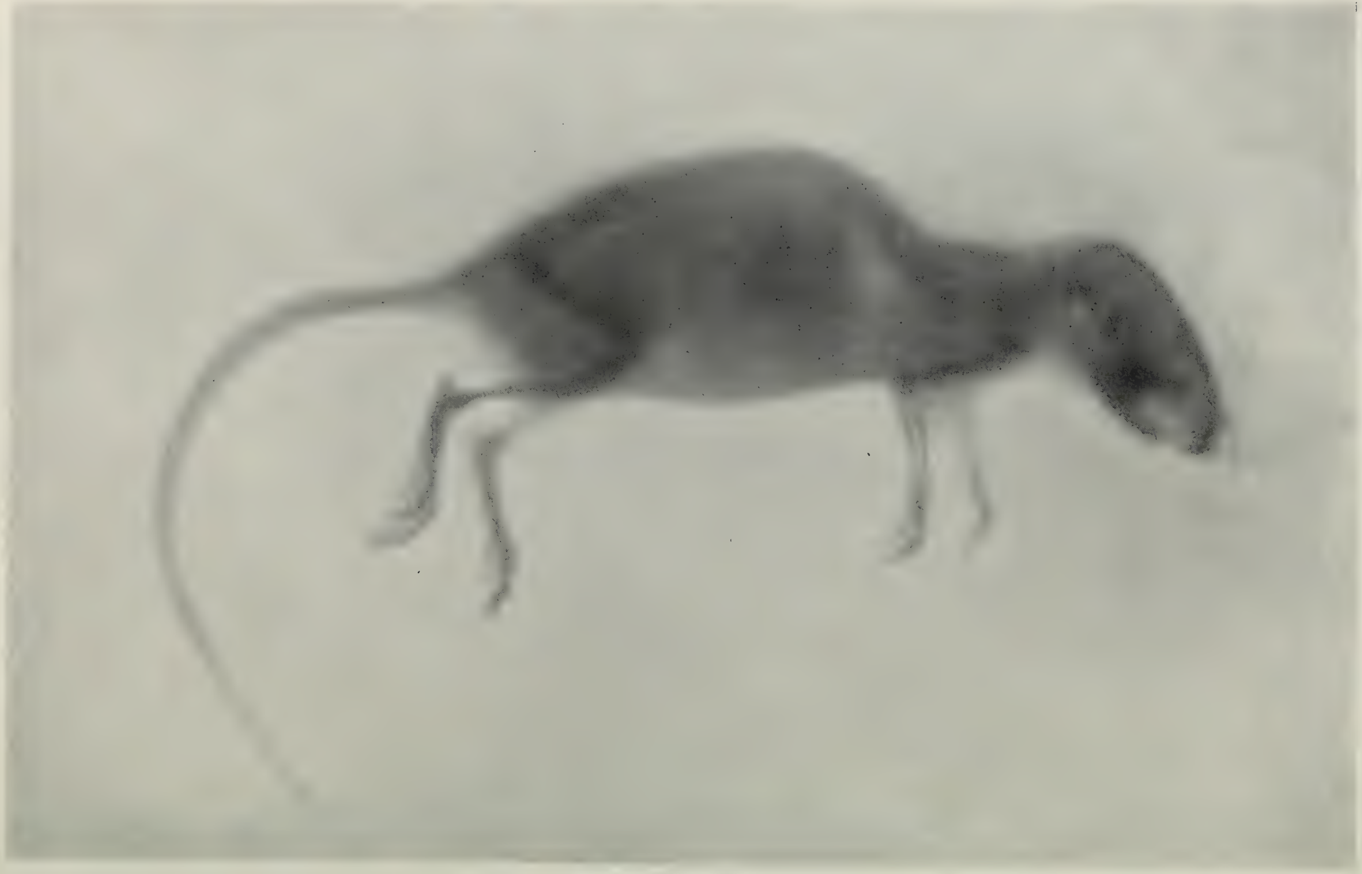
That is to say, these ultra-violet rays must behave quite differently from the visible, infra-red, and hitherto known ultra-violet rays.

These things appear so unlikely that I have sought for another hypothesis.

A kind of relationship between the new rays and light rays appears to exist ; at least the formation of shadows, fluorescence, and the production of chemical action point in this direction. Now, it has been known for a long time that, besides the transverse vibrations which account for the phenomena of light, it is possible that longitudinal vibrations should exist in the ether, and, according to the view of some physicists, must exist. It is granted that their existence has not yet been made clear, and their properties are not experimentally demonstrated. Should not the new rays be ascribed to longitudinal waves in the ether?

I must confess that I have in the course of this research made myself more and more familiar with this thought, and venture to put the opinion forward while I am quite conscious that the hypothesis advanced still requires a more solid foundation.

PROFESSOR W. C. RÖNTGEN.



YOUNG RAT, SHOWING SKELETON.

Made by Prof. A. W. Wright, of Yale, after Rontgen's method

In regard to Professor Röntgen's discovery, Mr. A. A. C. Swinton writes in *Nature*:

Working upon the lines indicated in the telegrams from Vienna recently published in the daily papers, I have, with the assistance of Mr. J. C. M. Stanton repeated many of Professor Röntgen's experiments with entire success. According to one of our first experiments, an ordinary gelatino-bromide photographic dry plate was placed in an ordinary camera back. The wooden shutter of the back was kept closed, and upon it were placed miscellaneous articles, such as coins, pieces of wood, carbon, ebonite, vulcanized fiber, aluminium, etc., all being quite opaque to ordinary light. Above was supported a Crookes tube, which was excited for some minutes. On development, shadows of all the articles placed on the slide were clearly visible, some being more opaque than others. Further experiments were tried with thin plates of aluminium or of black vulcanized fiber interposed between the objects to be photographed and the sensitive surface, this thin plate being used in place of the wood of the camera back. In this manner sharper shadow pictures were obtained. While most thick metal sheets appear to be entirely opaque to the radiations, aluminium appears to be relatively transparent. Ebonite, vulcanized fiber, carbon, wood, cardboard, leather and slate are all very transparent, while, on the other hand, glass is exceedingly opaque. Thin metal foils are moderately opaque, but not altogether so.

As tending to the view that the radiations are more akin to ultra-violet than to infra-red light, it may be mentioned that a solution of alum in water is distinctly more transparent to them than a solution of iodine in bisulphide of carbon.

So far as our own experiments go, it appears that, at any rate without very long exposures, a sufficiently active excitation of the Crookes tube is not obtained by direct connection to an ordinary Rhumkorff induction coil, even of a large size. So-called high-frequency currents, however, appear to give good results, and our own experiments have been made with the tube excited by current obtained from the secondary circuit of a Tesla oil coil, through the primary of which were continually discharged twelve half-gallon Leyden jars charged by an alternating current of about 20,000 volts' pressure, produced by a transformer with a spark gap across its high-pressure terminals.

For obtaining shadow photographs of inanimate objects, and for testing the relative transparency of different substances, the particular form of Crookes tube employed does not appear to greatly signify, though some forms are, we find, better than others. When, however, the human hand is to be photographed, and it is important to obtain sharp shadows of the bones, the particular form of tube used and its position relative to the hand and sensitive plate appear to be of great importance. So far, owing to the frequent destruction of the tubes, due to overheating of the terminals, we have not been able to ascertain exactly the best form and arrangement for this purpose, except that it appears desirable that the electrodes in the tube should consist of flat and not curved plates, and that these should be of small dimensions.

The accompanying photograph of a living human hand was exposed for twenty minutes through an aluminium sheet .0075 in thickness, the Crookes tube, which was one of the kind containing some white phosphorescent material (probably sulphide of barium), being held vertically upside down, with its lowest point about 2 inches above the center of the hand.

By substituting a thin sheet of black vulcanized fiber for the aluminium plate, we have since been able to reduce the exposure required to four minutes. Indeed, with the aluminium plate the twenty minutes' exposure appears to have been longer than was necessary. Further, having regard to the great opacity of glass, it seems probable that, where ordinary Crookes tubes are employed, a large proportion of the active radiations must be absorbed by the glass of the tube itself. If this is so, by the employment of a tube partly constructed of aluminium, as used by Lenard, the necessary length of exposure could be much reduced.

A. A. C. Swinton.

EXPERIMENTS WITH RÖNTGEN'S RAYS IN THE PHOTO-CHEMICAL LABORATORY OF THE IMPERIAL SCHOOL AT VIENNA.

PROF. W. C. Röntgen published in December, 1895, in his report to the Physical Medical Society of Würzburg his observations on a new kind of rays. He let the electrical discharges of a Ruhmkorff induction coil pass through a well-exhausted Crookes tube, which showed distinctly the cathode rays and peculiar fluorescent appearances. This tube was covered with a black card; in the completely darkened room a paper screen coated on one side with barium platinocyanide would shine brilliantly at each discharge (by fluorescence), no matter whether the coated or the other side of the screen was turned towards the apparatus. This proves that the light rays, or the power which produced this appearance, penetrated the black card as well as the paper of the screen; but also all other bodies brought between the screen and the apparatus, which at any other time would be considered as opaque, were penetrated, of course, in different degrees. The appearance suffered almost no change by boards of 2 to 3 centimeters thickness, while aluminium of a thickness of not more than ½ centimeter threw a considerable shadow upon the screen; all metals obstructed this new kind of rays, but in different degrees. Lead is fully opaque at 1½ millimeters thickness; aluminium, on the contrary, will admit the new rays pretty well. The transparency of all these bodies declines with increasing thickness, and Prof. Röntgen prepared a scale from tin foil, with which he demonstrated this distinctly. These unknown rays are called by Prof. Röntgen X rays. They show no regular reflection or refraction by mirror and lens, but the bodies behave towards them like the darkened media towards light rays.

That part of the tube wall which fluoresces strongest, where therefore the cathode rays appear, is the starting point of the X rays, which spread from there in all directions. The new rays are there (where they touched the tube wall), developed by the cathode rays, but differ materially from the cathode rays. The X rays act directly upon photographic bromide of silver gelatine plates, and it is possible to obtain photographs by them. If the human hand is placed in the path of the X rays, a shadow picture of the bones will originate, because the flesh is more easily penetrated by the rays—Prof. Röntgen made such a picture on the 4th of January, 1896.

I have repeated these experiments. With the aid of a Kahlbaum mercury air pump, I evacuated a Plücker glass tube (an egg-shaped vessel) until the spark of a Ruhmkorff induction coil sent through the same showed the Crookes fluorescence phenomena.

In this condition, which corresponds with a considerable rarefaction, the tube is suitable to proceed with Röntgen's experiments. A photographic dry plate was put now in a photographic plate-holder, a board put on top, and on this the light source, so that the X rays had to pass the board and holder. After fifteen minutes a strong photographic image was visible. To be certain that it was really the new X rays which produced this effect, we fastened to the inside of the plate-holder on the upper side a grating of sheet lead, which retains the X rays. The holder was closed light-tight, and exposed to the influence of the X rays. On their way they penetrated the board and holder, and then fell upon the lead grating, which kept them back. The photographic plate gave in the developer a strong picture of the grating, with distinct and sharp half-shadows. This was a fine confirmation of Röntgen's assertions.

Not only pine wood, but polished mahogany, thick black leather and black paper were easily penetrated by the X rays. The experiment succeeded with tubes filled with hydrogen, or the newly discovered part of the atmosphere, argon, and then exhausted. The kind of gas remaining in the Crookes tube is, therefore, of no consequence for the formation of the X rays.

Some difficulty came in the photographing of a skeleton of the hand, but I succeeded admirably on the 15th of January. The exposure was from one to two hours, with closed plate-holder.

During my experiments with Röntgen's rays I tested the behavior of several sensitive films towards these rays, namely, bromide of silver gelatine plates of greater or less sensitiveness, wet iodide of silver collodion plates, bromide of silver collodion emulsion, and wet eosine silver bromide of silver collodion plates (Albert's emulsion), and finally chloride bromide of silver gelatine plates, with alkaline development. It proved that all kinds of collodion plates have either none or extremely little sensitiveness for the Röntgen rays, but bromide of silver gelatine, iodo-bromide, and chloro-bromide of silver gelatine plates, with alkaline development, are sensitive to these rays, the bromide of silver gelatine emulsion being the most so. The favorable effect of the gelatine was particularly most striking by comparing a chloro-bromide of silver gelatine plate with a wet collodion plate, both of which had equal sensitiveness in common daylight. Exposed to the Röntgen rays, the wet collodion plate (iodide of silver, with acid iron development) was entirely non-sensitive, while the chloro-bromide of silver gelatine plate gave good results. The portrait plates, found in markets, are more suitable yet. Moisture (water) will injure the sensitiveness of the bromide of silver gelatine plates towards the Röntgen rays.

Scientific researches about the new X rays will undoubtedly bring forth much interesting matter. So far we know very little about them. As they suffer hardly any observable refraction in their passage through bodies, and are not reflected regularly, they differ materially from the visible infra-red or ultra-violet rays. The same may also be said of their absorption, which depends essentially, if not entirely, upon the density of the bodies.

Prof. J. M. Eder in *Correspondenz.*

JOTTINGS FROM GERMANY.

Röntgen's Discovery.—The Physical Society of Berlin celebrated its fiftieth anniversary at the beginning of this year. On that occasion some very interesting papers were read. Counselor Warburg demonstrated that electric rays can be collected by a concave mirror and reflected at a distance. Prof. Goldstein showed the sensitiveness of chloride of sodium. Not in daylight, but in the rays of Crookes cathode light, which according to its refraction, belongs to the extreme violet, rays which cannot be found even in the Schumann solar spectrum.

In this light chloride of sodium will color yellow in a second; chloride of potassium, violet; bromide of potassium, blue.

But the limit of light has not been reached by this. Prof. Röntgen in Würzburg has succeeded in obtaining by photography effects with this light which are wonderful and almost incredible.

This new light penetrates through a book of 1,000 pages, through boards of 2 to 3 centimeters thickness, and even through tin foil. A photographic dry plate in a closed plate-holder is affected by this new light.

Most astonishing is the picture of a hand, resting on a dry plate. The flesh, being transparent, is not visible, and all that can be seen is the bony part, the skeleton.

Dr. Liesegang writes about the photographic effect of the new light power discovered by Prof. Röntgen in Würzburg:

"Röntgen takes a Crookes tube—that is, a glass tube made completely airless, through which is passed an electric current, and photographs with the ordinary photographic preparations by means of the rays emitted by this tube. These rays, which are not visible to the eye, penetrate, contrary to the light rays, wood, organic matter and similar opaque bodies in the same way as ordinary light passes through glass.

In ordinary daylight with closed plateholder, a photographic picture can be taken with this light; that is, the light rays go the ordinary way and penetrate the wooden slide of the holder. Prof. Röntgen photographed the weights of a pair of scales in their box.

The weights, of course, are only visible on the picture. In the same way as ordinary light rays pass through glass, these newly discovered rays emitted from a Crookes glass tube pass through wood and the fleshy part of the human body.

A glass lens cannot be used with these experiments, as the current passing through the same is not refracted. The only thing that can be done now is direct copying. Röntgen made the skeleton of a hand by placing behind the object to be photographed a plate-holder with sensitized paper and letting the rays from the Crookes tube pass through the plate-holder and the object.

The rays fell therefore directly from the tube upon the hand.

The discovery was made by accident. Upon a table in his laboratory he had a Crookes tube wrapped up with some material, and, for some purpose or other, he let a pretty strong electric current pass through the same. After some time he observed that at a certain distance some prepared sensitized paper showed lines which, so far, had not been seen yet under the influence of electricity. The scientist continued his observations, and the result of his studies is the foregoing discovery.

The "Crookes tube" is a hermetically closed glass tube at whose ends platinum wires pass to the inside and from which the air has been pumped out. If an induction current is passed through the tube, a light appearance resembling fog results, which in form of straight-lined rays issues from the negative pole (cathode). These cathode rays were discovered in 1869 by Hittorf and examined by Goldstein and Crookes. Fluorescent and phosphorescent substances touched by the same emit light.

These properties of the cathode radiations were formerly only known and had only been studied within the glass tube. Lenard, however, discovered in 1893 that the rays could be passed through an aluminium window into the air and investigated there.

Shortly before Röntgen's discovery he had determined the following remarkable appearance:

The cathode rays are obstructed by bodies according to their density. Solid bodies will not let them pass, or only with difficulty, but through gases they will pass comparatively easily.

Like gravity, the absorption of the cathode rays appears, therefore, as an expression of the mass of matter.

There is, therefore, no solid body which is not to cathode radiation like glass is to light.

Diamonds and coal give about equal passage to this new power, while to light they will show the strongest contrast and difference.

While Röntgen proved these rays with chemical means, Lenard had recourse to the older method by way of phosphorescence. A tissue paper soaked with "pentadecylparatolylketon" served as a screen, which emitted light when touched by the cathode radiation. Lenard covered such a paper with four equally thick strips of aluminium, copper, silver and gold, and placed it under radiation. On the reversed side he then saw behind the aluminium a faint shadow; the denser copper gave a stronger shadow. Still darker it was behind the silver, and the gold was entirely black. If equally large strips were selected in proportionate thickness, so that all four were of equal weight, the shadow of all four would be alike.

Lenard has also determined that there are cathode rays of different character, and that they correspond to the colors in the light.

HENRY DIETRICH.

OUR ILLUSTRATIONS.

THE supplements accompanying this issue of the BULLETIN make it a notable one, and call for especial comment. Mr. Macfarlane Anderson, the inventor of the process by which the exquisite color print forming the frontispiece was made, has given in his article in this number many points well worthy of consideration. This color print is worth close scrutiny. It behooves us to call the attention of photographers as well as photo-engravers to the print alluded to. We would ask them to note the advances being made in color reproduction by engravers, and to learn therefrom a much-needed lesson. The photographer should be posted on photo-engraving, and should keep track of all progress affecting his art. To both engraver and photographer the color chart will possess exceptional interest. It is the only chart published which will give at a glance the plate sensitizer, plate, color screen, ink and order of printing for such color work as our frontispiece. This chart is printed from the plates used in Macfarlane Anderson's new book, "Anderson's Photo-Mechanical Processes and Guide to Color Work." For our full-page illustrations, showing the possibilities of Röntgen's method, we are indebted to Professor Wright. Details regarding them and their production will be found in our editorial. We take especial pride in these supplements, and feel that our efforts to present our readers with the latest and best are appreciated.

◆

IN our December issue an article appeared regarding acetylene gas. As Professor Chandler was in Europe at that time, we desire to make it known that the above-mentioned article was not an expression of his opinion.

◆

All matter for the April issue of the BULLETIN, *instructions regarding advertising, and so forth, must reach us on or before March 20th.*

Items of Interest

"I CONSIDER the best and wisest use of photography to be its employment as a means of recreation and enjoyment to the individual. It is an educative hobby in many ways. Of its definite applications, perhaps the most useful is the very general employment of photographs for press illustration. With the progress of time the photographer's work in this connection will improve; there will be fewer reproductions from slovenly and imperfect work for artists to rail at. Judging from the past, there is every reason to believe that even greater perfection will be aimed at and secured in the production of photographic apparatus and materials. The manufacture of lenses, cameras, plates, paper, etc., is receiving the closest scientific attention in every department, and improvements are being made daily. But, although in some cases the high-water mark seems to have been reached, at other points more can and will be done—for instance, in the rendering of color values, etc. I believe there will be a great increase too, in future, in the number of devotees of the camera, and, among those fittest who survive, the artistic and capable workers will be, for many reasons, more numerous than they are at present. With a high standard of work more general, I believe there will be an even more extended field of usefulness for the camera, both in science and, despite the ridicule of artists, in art."—J. A. Wilson in *The Junior Photographer*.

◆

A few photographs of the engagements between Cubans and Spaniards, in which battles after hours of heavy firing only two Cubans are wounded, would be mighty interesting.

◆

Toning by gaslight is seldom satisfactory. Colors are different, and the difference between such prints and those toned by daylight is very marked. When toning by daylight care must be taken that the prints are not exposed to a strong light, and the tray should be kept covered during the time the prints are at rest.

◆

The dusting brush should be kept in a box. Hanging it up, or laying it down on a shelf, is the ordinary treatment that this useful article receives, but when one considers how very much subsequent annoyance may be saved by a little care, it will be conceded that the best place for the brush is a box, where dust and moisture cannot get at it.

◆

A great deal can be done in the way of improving a negative by flowing the back of it with ground-glass varnish of good quality, and working on this with a stump and color. For example, if the negative be one lacking in contrast, the back of it is coated with the varnish and the lights strengthened with stump and blacklead, the finest details being gone over with a pencil. To obtain still further contrast, the varnish is scraped away from the deeper shadows, leaving bare glass. For negatives having excessive contrasts, the varnish covering the denser portions is worked away, the faint details in the shadows are worked up with the stump, and the finest details with a pencil

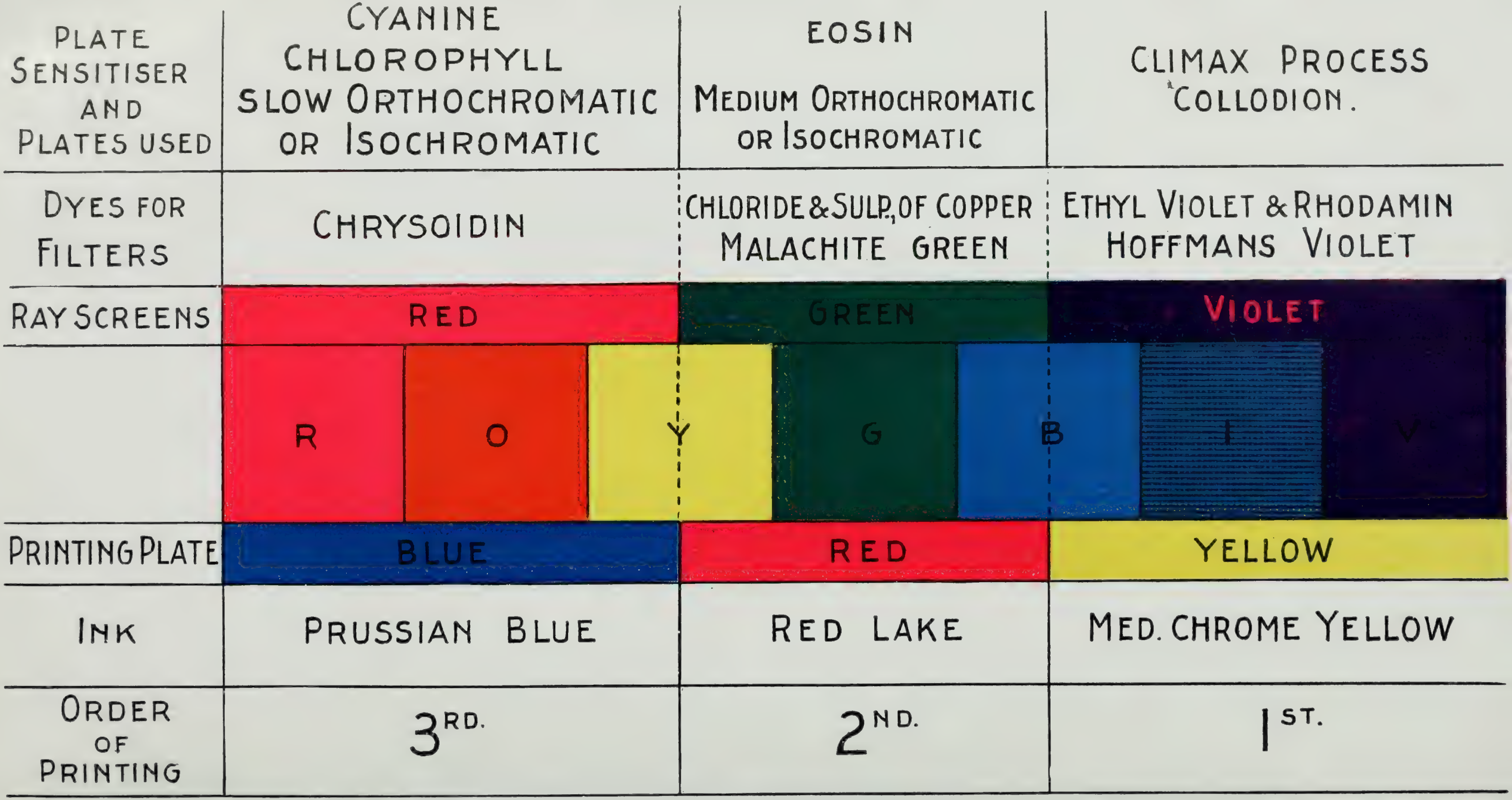


PLATE SENSITISER AND PLATES USED	CYANINE CHLOROPHYLL SLOW ORTHOCHROMATIC OR ISOCHROMATIC	EOSIN MEDIUM ORTHOCHROMATIC OR ISOCHROMATIC	CLIMAX PROCESS COLLODION.
DYES FOR FILTERS	CHRYSOIDIN	CHLORIDE & SULP., OF COPPER MALACHITE GREEN	ETHYL VIOLET & RHODAMIN HOFFMANS VIOLET
RAY SCREENS	RED	GREEN	VIOLET
	R O Y	G	B I V
PRINTING PLATE	BLUE	RED	YELLOW
INK	PRUSSIAN BLUE	RED LAKE	MED. CHROME YELLOW
ORDER OF PRINTING	3RD.	2ND.	1ST.

ANDERSONS PHUSOCHROME CHART.

FROM ANDERSON'S PHOTO-MECHANICAL PROCESSES AND GUIDE TO COLOR WORK.

METACARBOL, the new developer, has wonderful developing capacity. It seems to be capable of almost complete exhaustion before showing signs of weaker development. Add to this, its keeping capacity and its freedom from action on the skin, and it would seem that metacarbol is a developer likely to become a favorite.

◆

THE focusing screen should be divided to show the points of maximum interest. Again it is often desirable to show the space for lantern-slides. This marking is best done with a slate pencil, as the marks are plainly visible.

◆

THE BULLETIN subscription list is piling up. Help us by showing this copy to your photographic friends and by quoting us when writing to advertisers. It is a source of great gratification to us that our efforts are meeting with so much appreciation.

◆

FIVE galleries put in the electric light system for portraiture in the last week of January. Steady, uniform, constant lighting, entirely under control, and always available, is just what the professional photographer wants and can now have.

◆

WE hear nothing but praise of the flash cartridges recommended by us in our February issue. We do not wish to use the BULLETIN for pushing any particular articles, but believe our readers will be glad to have us notice really efficient novelties and to record our own experiences with such.

◆

A SWEDISH MAID.

Photo by PRITCHARD, Conn.

"A SWEDISH Maid," reproduced here in halftone, is an excellent study by Pritchard, of Meriden, Conn. We are glad to engrave any picture likely to be of service to our readers in general.

◆

BRUSH all your plates whether for use in the studio or in the field. With a backed orthochromatic plate only are the finest results obtainable.

◆

THE full-page illustrations in our February issue illustrated how a progressive photographer attracts business. The door display of C. D. Fredricks is one of the finest that we have ever seen, and cannot fail to attract the attention of every passer-by.

THE “going ashore” of the St. Paul furnished amateur photographers with plenty of material for pictures, not the least interesting being the old salts whose sapient remarks were eagerly absorbed by landlubbers. At the lantern evenings of the societies for months hence the St. Paul will be strongly in evidence.

* * *

IT is not advertising to speak of Aristo-Platino. Every amateur photographer who desires prints possessing in the highest degree artistic quality, and who desires to bring out the subtle points—atmosphere, etc.—in his negatives, uses this peerless paper. Postal regulations prevent our sending out actual photographs showing the new tone on Aristo-Platino, but on request we will gladly mail a specimen print to be used as a standard. The toning formula recommended is as follows:

Tone in a plain gold bath, made slightly alkali with borax, to a point which is reached immediately after the whites have cleared up, then wash through three changes of clear water and tone in platinum bath. Make up the following stock solution:

E. A. Platinite	15	grains.
50 per cent. solution phosphoric acid	2½	drams.
Water	2	ounces.

To tone: Take 1 dram above stock to 20 ounces of water; if it is not strong enough to get the desired result in six to eight minutes, add more stock solution.

After platinum toning, prints are washed through two waters (this is important), and fixed ten minutes in a fresh hypo bath testing eighteen by the hydrometer, then finally washed.

NOTE.—Negatives should be full timed and slowly developed. Print to good depth.

* * *

MR. A. E. CASSON says that collodio-chloride emulsion paper was invented in 1865 by Wharton Simpson. The excellence of the paper lies in the definite and stable character of the silver salts, and in the thinness and non-absorbent character of the film. The chief characteristics of the paper are: Purity of the whites, ease of toning, absence of double tones, evenness of toning, and quick drying. In this country the collodio-chloride papers universally used are Aristo Blue Label, Aristo, Jr., and Aristo-Platino.

* * *

MR. W. P. BUCHANAN, the popular photographic stock dealer, of Philadelphia, entertains his employees and patrons every year with a lantern-slide exhibition. At the third annual show held January 23d, the famous white cat “Grover” occupied a conspicuous position on the stage. A most enjoyable evening was spent.

* * *

“Certain makes of plates seem to be more afflicted than others by this defect, which, however, can be removed quickly and with certainty by the application of any slow-acting reducing medium. The simple acid fixing bath is one of the best:

Sulphuric acid	30	minims.
Sodium hyposulphite	8	ounces.
Sodium sulphite	1	ounce.
Chrome alum	5½	drams.
Warm water	32	ounces.

“Dissolve the hypo in 24 ounces of water, the sulphite in 3 ounces; mix the sulphuric acid with 1 ounce of water, and pour slowly into the sulphite of sodium solution and add this to the hyposulphite solution; then dissolve the chrome alum in 4 ounces of water, and add to the bulk the above solution, and the bath is ready. Immerse the fogged negative into this bath and allow it to act until the requisite clearness in the shadows is reached.

"Belitski's permanent green reducer offers great advantages for clearing fog, giving results equal to any of the existing formulas:

Water	7	ounces.
Potassium ferric oxalate	2½	drams.

When this is dissolved add—

Neutral sulphite of soda, crystallized	2	drams.
Oxalic acid	40	grains.
Hyposulphite of soda	1½	ounces.

"This must be kept in corked bottles in the dark, as under the influence of light the ferric salt is reduced to ferrous. It may be used repeatedly, as, if care is taken, it keeps a long time and acts in a remarkably even manner.

"The chemical or colored fogs, green, yellow or red fog, are, however, not to be removed by reduction, a peculiar condition of the reduced silver giving rise to their appearance which necessitates a different procedure. It is, therefore, recommended by the best authorities to change the reduced silver once again into a silver bromide and then by a suitable development obtain the desired gray-black argentic reduction with corresponding clearness in the shadows. The manner of obtaining these results is a simple one, and the results are sure in almost every instance. Any discoloration arising from the oxidation of the developing agent will not yield to the above method, but must be treated by a method of its own, and hence we are compelled to use the word almost, as above.

"To overcome the defects produced by the green, yellow or red fog, it is recommended to place the dry negative in water for ten minutes, so as to thoroughly soften the film, then place it in a solution of—

Water	3½	ounces.
Bromide of soda	75	grains.
Bromine	45	"

"The mixture is to be thoroughly mixed by shaking in a well-corked bottle. Place the negative in a tray, and then pour the solution over it. This must be done in the open air, as strong noxious fumes are generated.

"In this bath the negative bleaches out completely, and appears on the reverse as a positive. It is then well washed, after which it is redeveloped with a fresh solution of any developing formula. This can be done by daylight. The development is to be continued until the plate appears black, and by transmitted light appears gray black. Reddish or brown tones sometimes appear during development. They are transitory only, and are not to be taken into account, as they disappear with continued development. The only point aimed at is to obtain the desired gray-black tone with requisite clearness in the shadows; therefore the time of development is of no moment, as it has no detrimental effect. When redevelopment is complete the negative should be washed for two hours. Should frilling make its appearance or the plate be one with a known tendency thereto, it can be overcome or prevented by placing the plate for a few minutes in a weak solution of chrome alum.

"Ordinary yellow fog yields easily to treatment with a thiosinamine solution which has less objectional features than the above.

Thiosinamine	5	drams.
Citric acid	2½	"
Water	32	ounces.

"The negative is merely placed in the above until cleared. The result is permanent."—*Journal of Society of Amateur Photographers.*

* * *

Wood may be satisfactorily ebonized by moistening it with 5 per cent. sulphuric acid, and then heating. The water is driven off, and the acid chars the surface of the wood, a temperature of 60 to 90 degrees Cent. sufficing to produce the desired result in a few moments. In order to remove the acid from the wood, it is washed with dilute soda solution, and then with water.

THE DANGER IN THE USE OF FLASH-LIGHT POWDERS.

CAUTION may be mistaken by some persons for timidity, while confidence may seem to bespeak familiarity and practical knowledge; but there are many cases in which such erroneous ideas lead to disastrous results. This is emphatically true, both of the preparation and use of the various flash-light powders. Perhaps too scant attention has been directed to such dangers, and frequently one sees formulas, which the chemist would regard as highly dangerous, given without a word of caution. Not a few of the flash-light compounds may be classed as high explosives, while it may safely be said that the operation of every flashing device, except the electric spark, may be considered as an explosive. Caution, then, in the use of such substances is highly commendable.

The danger is by no means confined to the ranks of the amateur photographer, for experience has shown that the scientist and practical photographer are not exempt. The experimenting habit is strongly developed in the amateur. When he desires to use a flash-light he will frequently consult a book of recipes and formulas, or the files of some technical journal, for directions to enable him to manufacture his own compound. While the spirit of experiment is a laudable one, in this case it is to be condemned, unless the experimenter be thoroughly versed in chemistry. It is a safe rule to allow the chemists to do all the experimentation, and purchase the flash-light powder already prepared. One may safely add that precautions cannot be too strongly laid down in the circular of directions accompanying such preparations. And it might not be amiss to suggest that the periodicals and journals always accompany a flash-light formula with the requisite precautions.

The base of such preparations is usually either potassium chlorate or nitrate, to furnish the oxygen to combine with some highly oxidizable substance, such as some metallic sulphides or phosphorus. These substances should never be triturated together in a mortar. Each should be separately ground in a clean mortar, and the mixing be effected with a spatula, and done gently to avoid heating by friction or blows.

In Chicago alone, in the past few months, the flash-light has been responsible for several bad accidents. In one case a professional photographer was mixing a large quantity of powder, as he was in the habit of making up his own preparation. It accidentally exploded, and partially wrecked the studio, and set fire to the building, besides burning the operator very seriously.

A case within the experience of the writer may be cited. Several years ago, a professional chemist was experimenting with a view to develop a slow-burning flash powder. A compound of powdered magnesium, potassium chlorate and sugar was used. This gave excellent results, but yielded too much smoke. On one occasion black sulphide of antimony was added, to increase the intensity of the light. While firing a charge the experimenter burned his right hand very badly. The addition of the sulphide caused such a rapid explosion that the flash spread laterally, owing to the cushioning of the air. Such powders can only be fired with safety by the use of a torch or fuse.

Mr. Frederick Wilhoit has kindly furnished the writer the particulars of an accident which recently occurred to him. He states that he had been using a flash-light powder which, when fresh, exploded rapidly and was almost entirely odorless. The powder was made according to the formula:

Chlorate of potash	1	ounce.
Powdered magnesium	4	drams.
Amorphous phosphorus	10	grains.
Black antimony sulphide	20	"
Golden antimony sulphide	10	"

This powder deteriorates rapidly, owing to the phosphoric acid contained in the phosphorus. The acid may be removed by washing. On this occasion he had washed some phosphorus and dried it on filter paper, while he was preparing the other chemicals, sufficient to make 1½ pounds of the powder. The requisite weight of the dried phosphorus was placed in a brass sieve, and, while sifting this into the chlorate of potassium, it suddenly ignited, setting fire to the entire mixture. A violent explosion followed, throwing the sieve out of his hands, and the burning mixture over his face and clothing, and on the floor. Fortunately he was able to quickly extinguish the flames on his clothing and the floor, but his hands and face were severely burned by the explosion. These accidents are typical of experiences that are only too common. Some photographers, for such reasons, abstain from the use of all explosive compounds, and prefer to depend for a flash-light on magnesium powder burned in a flame.

W. M. STINE.

ARMOUR INSTITUTE OF TECHNOLOGY.

CHANGING BAGS.

AFTER using a changing bag for over five years, I wonder how any one can possibly get along without one, and yet I am the only person who uses one, so far as I know, excepting those who often borrow mine.

The bag is about 27 inches square, with elastic arm-holes at two corners. As the elastics became slack by use and age I had short sleeves added, with elastics at the outer end of the sleeves. These will readily stretch out so as to take in 5 x 8 holders and boxes for 6½ x 8½ plates, although the bag is not quite large enough to conveniently accommodate the larger size. The bag is composed of three thicknesses of cloth, a red piece arranged between two of black. I generally put the several holders and a box to receive the plates into the bag, and then, as a matter of precaution, unload all the holders and deposit the plates in the box before refilling any of the holders. Then I withdraw the box of exposed plates, and put in a box of unexposed plates for refilling. Turn the holder with the slide downwardly to draw the slide, then lay down the slide without turning it over, turn over the holder, put in a plate properly brushed by a brush kept in the bag, and then put in the slide without turning it, and it will be the proper side out for indicating an unexposed plate. If the plates are boxed face to face, with a mat between, there will be no difficulty in telling which is the film side, but if not so packed, or, to make doubly sure, a moist sponge may be placed in the bag, just previous to changing, with which to moisten one's fingers for touching one corner of the plate; the film side will stick to the moist fingers. Upon first taking the holders from the bag, it is best to see that the slides are all the proper side out, and, if not, the holder can be put into the bag again for turning the slide, or it may be turned in the camera.

I carry only three double holders, and can change the six plates in about ten minutes. The bag is much lighter to carry than extra holders would be, and with the bag there is no limit to the number of plates used in a day, except the number provided and the time required to use them.

Even for night changing, when traveling, I prefer to use the bag in a lighted room rather than fuss with a lantern or properly darken a room. The brightest sunshine never fogs a plate in this bag. It avoids hunting for a darkroom or other proper place to change plates, avoids waiting for night to come, for I change plates at any time in almost any place, on the ground, in the cars, and even in a wagon when riding along on the country road.

If field photographers only knew how useful and convenient these changing bags are, and then knew where to buy them, I am sure that they would be much more frequently used. JAMES SHEPARD.

MINUTES OF THE EXECUTIVE COMMITTEE OF THE PHOTOGRAPHERS' ASSOCIATION OF AMERICA.

HOTEL HUMPHREY, JAMESTOWN, N. Y., JANUARY 20TH, 21ST, AND 22D:

The meeting called to order by President Bellsmith. Treasurer Hayes and Secretary Kellmer present. The minutes of the 15th Annual Convention held in Detroit, Mich., read and adopted. The resignation of Second Vice-President W. J. Root was received and read, and, on motion, accepted.

President Bellsmith appointed Mr. George T. Bassett, of Indianapolis, to fill the office of Second Vice-President, which appointment was confirmed by the Board. Motion by Mr. Bassett and seconded by Mr. Hayes to empower Secretary to collect outstanding bills for floor space at Detroit Convention, amounting to $290. Carried.

Moved by Mr. Hayes and seconded by Mr. Bassett to print 2,000 copies of constitution and by-laws in pamphlet form with the addition of change in constitution made at Detroit Convention, with a list of officers and members, and to solicit advertising matter from manufacturers and dealers to defray the cost of printing same, and that a copy of each be mailed to every member of the Association. Carried.

Moved by Mr. Bassett and seconded by Mr. Kellmer that Mr. Hayes, Treasurer, shall settle bill of the Biglow Flash Light Machine in the most satisfactory manner possible and report same to Secretary. Adjourned.

JANUARY 21, 1896.

Meeting called to order. President Bellsmith in the chair. Moved by Mr. Bassett and seconded by Mr. Hayes that the 16th Annual Convention of the Photographers' Association of America be held in the auditorium at Celeron, Chautauqua Lake, the week beginning June 22d to 27th, inclusive. Carried.

The reason for holding Convention at this early date was decided upon by the Committee on the assurance by Mr. Broadhead, the President of the Celeron Amusement Company, that this time of the year is the most pleasant and that there will be better accommodation for visitors than later in the summer.

Resolved, That the territory covered by the Photographers' Association of America be divided in four sections, for the purpose of encouraging competition.

The divisions to be known as the Eastern, Western, Middle and Southern. Each division will have a separate set of prizes in all classes, and the winning exhibits of the first prize in genre and A classes in each of these respective divisions will be at once entered to compete for the grand portrait and grand genre prizes.

The eastern division to consist of the following States: Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York, Pennsylvania, Maryland, New Jersey, District of Columbia, and Dominion of Canada.

WESTERN DIVISION.

Washington, Oregon, Minnesota, California, Idaho, Utah, Arizona, Montana, Wyoming, Colorado, New Mexico, Nebraska, Kansas, Missouri, Indian Territory, Texas, North and South Dakota, Nevada, Oklahoma.

SOUTHERN DIVISION.

Arkansas, Louisiana, Mississippi, Alabama, West Virginia, Delaware, Tennessee, Kentucky, North Carolina, South Carolina, Florida and Georgia, Virginia.

MIDDLE DIVISION.

Wisconsin, Iowa, Michigan, Illinois, Indiana and Ohio.

Members of the Photographers' Association of America, in each division to compete separately in the following classes: The first prize winners of genre class, in each division, to compete for a grand prize to consist of a bronze figure piece. The prize winners of each division in Class A to compete for one grand prize, to consist of a silver loving cup.

The exhibits winning the grand prize in the genre and Class A to become the property of the Association, for the purpose of forming a permanent exhibit.

Special attention is called to the fact that one-third of the possible points are marked in the genre class for originality.

This plan affords the possibility of a member's work meeting with a just award by virtue of competition with the fellow-fraternity of his own section of country, without interference with the work made by members in foreign territory, with whom they do not compete or meet in their regular business relations.

In addition to this, it encourages all sections of the country to competition and progress, inasmuch as the grand portrait and grand genre prizes are awarded by a competent selection of the best work culled from only the first prize winners of the various divisions of territory, and gives each section equal chance in winning the two grand prizes.

LIST OF PRIZES.

Genre Class.—Three pictures, 13 inches, or larger, on any matt-surface paper; subject to be chosen by the photographer; the title to be appropriately inscribed on each picture. To be framed at the discretion of the exhibitor, with or without glass. One gold medal.

Class A.—Twenty-four pictures, six pictures to be 16 inches, or larger; one gold medal, one silver medal, one bronze medal, and one diploma.

Class B.—Six pictures, 13 inches, or larger; one gold medal, one silver medal, one bronze medal, and one diploma.

Class C.—Twenty-four pictures, 10 inches, or smaller; one silver medal, one bronze medal, and one diploma.

Class D.—A rating competition—twelve cabinets only. First prize, one silver medal, and to all receiving 21 points, or over, a bronze medal.

Class E.—Landscape with or without figures; six pictures, marine views or interior, 13 inches, or larger; one silver medal, one bronze medal, and one diploma.

Class F.—Landscape with or without figures; twelve pictures, marine views or interior, 10 inches, or smaller; one silver medal, one bronze medal, and one diploma.

Class G.—Combination pictures—three combination prints, size to be left to discretion of the photographer; one silver medal, one bronze medal, and diploma.

Class H.—Commercial pictures; one silver medal, one bronze medal, and one diploma.

Class I.—Most tastefully arranged exhibit; one diploma.

Class J.—Foreign exhibit; best collection of photographs, any size, framed or unframed, to be delivered to the Association free of charge; one gold medal, one silver medal, one bronze medal, and one diploma.

Rules and Regulations.

1. All competitors must be members of the Association.

2. Exhibitors cannot compete in more than one of the following classes: A, B, C or D. All photographs for Association prizes must be made from negatives taken since the last Convention.

3. One dimension given to either length or breadth of pictures in all classes. This rule applies to the size of the print and not the mount.

4. Should any exhibitor or exhibitors use his or their influence in any way directly or indirectly with the judges during their term of office in favor of any exhibit, it shall be the duty of the judges to strike their exhibit or exhibits from the list. All exhibits must be framed with or without glass. The Committee suggest a 1-inch oak frame.

5. Ten marks to be the highest given for any 1 point, consequently 30 points is the highest that can be given to any one picture.

6. All exhibits must be shipped to Jamestown, N. Y., in care of Photographers' Association of America by June 15th and all charges prepaid.

7. Entries for art department to close positively June 10th. No space will be allotted after that day. Application for space in this department must be made to George T. Bassett, Second Vice-President Photographers' Association of America, No. 40 North Illinois street, Indianapolis, Ind.

8. All art exhibits must be sent to George Steckel, First Vice President Photographers' Association of America, to Jamestown, N. Y,, and all charges prepaid.

9. Exhibits from stock department to be shipped to J. Will. Kellmer, Secretary of Photographers' Association of America, charges prepaid, to Jamestown, N. Y., and placed in position by 10 A. M. June 22d.

10. Have your box covers screwed instead of nailed; put your home address on the under side of cover for return of pictures, put screw eyes and picture wire in box and ship your exhibits early.

11. All boxes and packages will be accepted at any time previous to the Convention, so that photographers need not feel any uncertainty about the safety of their goods. No exhibits will be allowed to be removed from the hall until the close of the Convention.

12. All these rules and regulations will be strictly adhered to.

Appointment of Judges.

1. Three judges to be appointed for each division by the Executive Committee and their identity to remain unknown until after the awards are made.

2. Three judges to be appointed for the grand genre, the grand portrait, the foreign, and most tastefully arranged exhibit, by the Executive Committee.

January 22, 1896.

Meeting called to order. President Bellsmith in the chair. Report of the Secretary for 1895 read. On motion of Mr. Bassett and seconded by Mr. Hayes to accept same. Carried.

Report of Treasurer for 1895 read and account audited by President Bellsmith and the Secretary. On motion of Mr. Bassett and seconded by Mr. Hayes adopted as read.

A proposition was received from Mr. Broadhead, President of the Celeron Amusement Company, offering to rent the auditorium, including band and all privileges, for $300. On motion of Mr. Bassett and seconded by Mr. Hayes proposition was accepted, and the Secretary was instructed to inform Mr. Broadhead by letter to accept the same. Carried.

Committees.

President Bellsmith and Mr. Hayes, Committee on Railroads. Committee on Medals and Grand Prizes, President Bellsmith and Mr. George Bassett.

The bond of Mr. Hayes, Treasurer for 1896, was accepted, his bondsmen being Mr. George Russell, of Detroit, Mich., President of the States Savings Bank, and Mr. George R. Angell, of Detroit, Mich., Cashier City Savings Bank.

Adjourned. *Sine die.*

By Stephen H. Horgan.

PROFESSOR HERKOMER'S AUTOGRAVURE PROCESS.

QUITE a sensation has been created among artists and engravers in Europe by the exhibition of some prints similar in appearance to mezzotint, made by a method invented by Professor Hubert Herkomer. It is claimed that through this invention all painters can make prints of their own canvases and dispense with the photogravure and mezzotint methods of reproduction. The prints already produced by this method have brought extravagant prices. Here is the English patent, in brief :

No. 25,056. "Artistic Printing Surfaces. H. Herkomer and H. T. Cox, Bushey, Herts, dated December 24, 1894.

"Painting on a ground, or base, a picture in a greasy or tacky medium, and surfacing the same, while still tacky, with a granular substance possessing electrical conductivity. After removing the excess of granular substance, the coated picture is submitted to an electrotype bath for the production in copper of a counterpart of the picture."

In describing his "new art" before the Fine Arts Society, of London, Professor Herkomer stated that "on the polished surface of a copper plate, coated with silver, the artist painted his picture with a thick black pigment resembling printer's ink. In the production of this painting he used brushes, leathers, bits of wood, his finger-tip—in fact, anything that would enable him to get the desired effect. So far, it was a positive process, requiring therefore no reversion of the subject on the plate—an inestimable boon to the artist. An examination of the painted plate showed that the ink was on the surface in different degrees of thickness, and in this variety of depth in the ink lay the first vital point of the invention. The artist, however, need in no way think of this necessary condition ; it came without conscious effort in the making of his tones and gradations. This painted surface, with the ink still wet or soft, was then dusted over with a particular granulated powder, until neither the black paint nor the brighter parts of the plate were visible. A knock on the back of the plate, and the subsequent use of a soft camel's-hair brush removed the superfluous powder. As the powder contained both coarse and fine particles, it stuck to the various parts in a most discriminative way, the coarser grain adhering to the parts where the ink happened to be thick, and the finer where the ink was less, such as in the gray or light tones.

"Thus there was now secured a painted picture, dusted with a powder which granulated the painted touches in perfect proportion to their depth of tone, without, however, in any way altering their autographic character, but it caused the paint to cover new technical ground, and was the first stepping stone towards the conversion of the painted surface into a printing surface. In the third stage there was taken of this granulated surface 'a metallic mould,' or, in other words, an electrotype. Such was the conductibility of this surface that (all things being right) in ten minutes a blush of copper would spread over the whole surface when subjected to the electric bath. This settled in the most minute crevices and interstices. The plate was left in the bath until the copper deposit was as thick as an ordinary printing plate. By filing the edges the deposited plate was separated from the original painted plate, and in the former was obtained an exact negative or mould of the painted and powdered surface from which, by the ordinary methods of copper-plate printing, a perfect reproduction of the original painting was obtained."

The fatal drawback to Professor Herkomer's invention is that all painters are not as ingenious in the handling of brushes as he is. A painter, to succeed with it, would require to possess all the mechanical dexterity of a Herkomer, and there is but one Herkomer.

PHOTO-ENGRAVERS' AXIOMS.

From "Modernized Advertising," by the enterprising Binner Engraving Company, of Chicago, the following terse sentences are selected. Each one is an argument for the more extended use of process work :

"The right kind of a picture always helps out any kind of an ad.

"Make good use of the eyes of the public. Illustrate well what you want them to see

"Your advertising space will cost you no more illuminated with a catchy design.

"A shoe is a shoe, but not every shoe is a fit. No more is any and every kind of illustration.

"Does your competitor illustrate his ads? If he does, illustrate your ads better than he does.

"Tell the truth when you advertise. Do not tell a lie by exhibiting poor illustrations of your articles.

"Take any modern catalogue, cut out the pictures, and then see how you like it as an advertising medium.

"In these times of multifarious advertising, a good eye-catcher is the first thing necessary. A good picture serves that purpose.

"Men and women are but grown-up children. Like them, they have an inveterate love for pictures. Avail yourself of it in your advertising.

"The public taste for art has been too much developed in the last few decades to permit any poor illustrations, even in advertising. Poor pictures are a plain insult.

"Thousands of dollars are spent in perfecting and constructing a machine. Don't have it portrayed in your catalogue with a cheap cut. A few dollars more for a perfect cut will bring you good returns. Let your cut be as good as the machine."

PROCESS NOTES.

They are at last applying half-tone to poster work. The screen used was twenty-five lines to the inch.

Mr. E. J. Wall says that the best color filters for three-color work are made of crystal plate glass, coated with plain collodion and saturated with aniline dyes.

Process Work, of London, has begun experiments to settle the question of the practicability of a grain screen. Their conclusions will contribute much to the settlement of this disputed question.

According to the *Process Photogram*, the usual day's work for a photo-engraver in England is from 8 A. M. till 7 P. M. But some of the men have to stay overtime every night—sometimes till midnight, sometimes later.

Anent Professor Röntgen's discovery of the penetrating power of X rays, *Process Work* suggests that we may be soon working with pitch lenses, vulcanite prisms and papier-maché screens. The camera and plate-holders will probably have to be made of Bessemer steel, and the negatives made on aluminium.

The London "art world was breathless with excitement in anticipation of Professor Herkomer's new art. Every artist was to be his own process worker. Other process men were to become bankrupt," &c. Our readers will find a description of Professor Herkomer's process elsewhere, and can judge for themselves its value as a revolution worker.

REVIEW OF EXCHANGES RECEIVED.

The first number of the *American Process Review* comes from Toronto, Canada. It is printed on good paper, and is largely a rehash of old matter.

Process Work, "Penrose & Co.'s monthly circular for workers in all photo-mechanical processes," comes from London even more bright and interesting than ever.

The *Process Photogram* has improved its typographical appearance, make-up and press work. Its editorial staff allow nothing of timely interest to escape them.

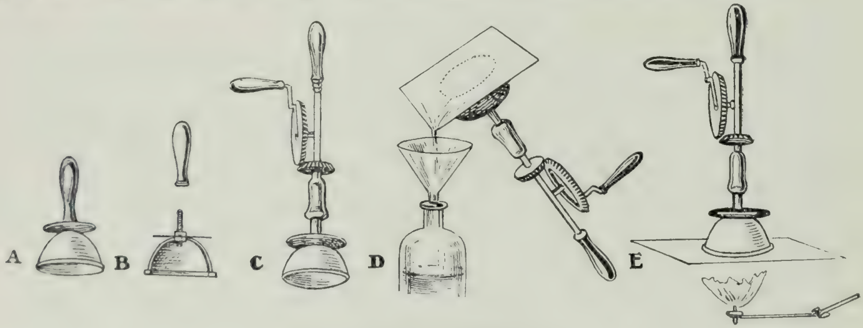
The series of articles on process engraving, by H. Jenkins, now running in the *Inland Printer*, contain the most thoroughly practical instructions on the subject thus far published.

Paper and Press has come to the conclusion that publication in Philadelphia was like being buried. So it moves to the living city of New York. In its resurrected form it becomes a weekly.

The welcome announcement comes from Messrs. Penrose & Co., of London, that their *Process Year Book* will be ready the second week in March. It promises to be a treasure. Messrs. E. & H. T. Anthony are the American agents.

AN ECONOMICAL WHIRLER FOR ENGRAVERS.

Mr. Carl Von Manstein, of Atlanta, Ga., sends to the *Inland Printer* the accompanying cut of a whirler, which he describes as follows:



The Suction Cup and Drill in Use.

"The person wanting a whirler that is simple of construction and simple to operate may get an ordinary hand-drill with the side wheel similar to the one shown in illustration, then go to a plumbing-supply company and buy a suction cup; it is something like *A*. Now remove the handle from the cup and insert a quarter-inch bolt instead, so that the threaded end can be inserted in the drill chuck and fastened; it is like *B*. When fastened, wet the back of the plate to be sensitized, and press the rubber cup down upon it, expelling the air; remove the pressure, and it will be found that the plate adheres to the cup firmly. Now, rinsing off the face of the plate, proceed to flow similar to a zinc plate, draining (*D*) off the surplus solution into a receptacle, ready to be refiltered; then turn face down (*E*) and whirl over a gas flame. If the solution is thin the plate should be flowed a second time before the first coating is dry. I have used all the various machines, and find that this simple device surpasses them all for convenience, time saved in adjusting machine to suit size of plate, and in saving waste solution. I have flowed plates varying in size from 4 x 5 to 12 x 15, and it has given satisfaction all the time."

ORGANIZING THE PHOTO-ENGRAVING TRADE.

It was long ago urged in these pages that the hope for the future of photo-engraving as a business lay in the organization of the firms engaged in it. The objection most commonly made at that time was that there were men in the business who could not be trusted to maintain any agreement entered into. Our extended acquaintance with these firms leads us to the opinion that business honor is as general among them as could be found in any other line of trade.

It is gratifying to learn that the idea is being carried out in London. *Process Work* gives a long list of the firms co-operating in this matter, and says:

> "It will be seen there are hardly any notable exceptions. Four important firms who might be mentioned probably did not think the matter concerned them, as they neither "cut" nor are affected by cutting. The few small firms left would be quite unable to cope against such a strong and unanimous combination as this meeting evidences. It therefore rests with those firms who have agreed to the minimum rate to stand fast to it, and the result will be beneficial, individually and collectively. The minimum rate decided upon is quite low enough to meet the customer, and it leaves a living profit. How much more than the minimum can be secured will depend entirely on the quality of the work.
>
> "It is urged that some firms will be sure to break through the agreement, but we refuse to believe that any of the firms who have thus pledged their word will be so dishonorable as to go back upon it, knowing, moreover, how disastrous has been the price-cutting in the past. If one firm has got an innings with certain work, and is doing it at the minimum rate, let that firm keep it, unless some one else can show better or quicker work at the same price. That is the only sound competition."

UNDERLAYS, NOT OVERLAYS, FOR HALF-TONES.

It is safe to say the majority of half-tone cuts are spoiled in the printing. Printers are so slow to change their old methods that, because they overlaid line cuts, they will continue to treat half-tones in the same manner until they are themselves overlaid with sod.

Mr. Frank Beck tells in the *Inland Printer* how he prepares half-tones for the press, from which any photo-engraver could learn to manage underlays and insert between the cut and its mount. Mr. Beck writes:

> "I obtain all the cuts on a certain piece of work from the composing-room before they are made up in the forms, and of each cut I have proofs taken on three different weights of paper—60, 70 and 80 pounds—and then proceed to make cut underlays. Taking one of the proofs on the 70-pound stock, I carefully trim it all around, leaving a margin of $\frac{1}{16}$ inch of blank all around the print. I then cut out of the sheet all of the extreme high lights, being careful to cut a little of the surrounding shadows with them, the purpose of this being to prevent too much impression on the point of division, which would have a tendency to bring up the shallows. I then take the proof on the 80-pound stock and remove from it the extreme blacks and solids—always cutting a little inside the line—and paste them on the 70-pound sheet already treated, using common flour paste or mucilage. I then take one of the proofs on 60-pound stock, and cut out all of the intermediate shades, such as should appear lighter or softer in the finished print. I take these several proofs and paste them together, and then I have what would be called a four-ply cut overlay, excepting that all of the pieces comprising it are cut a trifle inside of the line.
>
> "Having made my underlays in the manner described, I unmount the cuts from their bases.
>
> "I take the calipers and mark at least two distinct points on the back of the plate in order to be able to paste the underlay accurately in position. This done, I lay the cut face up on the iron plate, and with a small boxwood planer I go over the entire surface, taking care to strike only a moderate blow. I take the block thereafter and examine it carefully to see that it is free from lumps and rough places, and

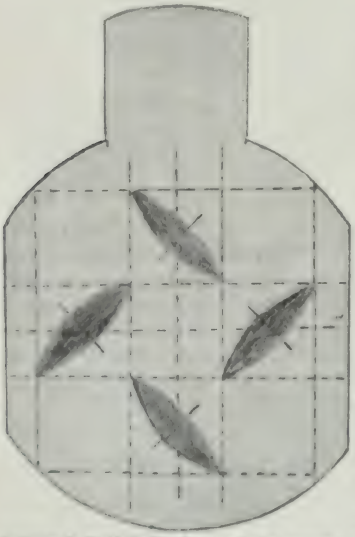
mount the cut on the opposite side to that from which I took it, and send it to the composing-room.

"This method, I find, saves a great deal of time in the final make-ready of the form, as it is only necessary to even up the impression on the cut, and the underlay will throw the lights and shades where they should be without any further care on the part of the pressman, and for long runs will preserve the cut much better than if a plan of overlaying was followed. It holds up to the rollers the dark parts of the cut, properly supplying them with ink and protecting the lighter and more delicate shades from receiving unnecessary pressure."

The best photo-engraving houses underlay half-tones before proofing them on the hand press, but they make a mistake in not delivering this underlay with the cut, so that the printer can make use of it. This would be but fair to their customers, for the proof that accompanies the block does not show what result the latter will give, but the result of the block, plus a certain underlay, which latter is often an accident. This underlay, once destroyed, is difficult of duplication, and the printer should at least see it as a guide for getting the effects shown in the proof.

ADVANCEMENT IN COLOR WORK.

WE are steadily advancing in the quality of our color work. Contrast the color reproductions of to-day with those of just twelve months ago, and you will leave the skeptical to fault finding and think probably a little more of those who work.



Anderson's Multiple Diaphragm giving correct values in Phusochrome work with one-third the Exposure of the Single Aperture. To be used with the coarse Levy diagonal grating.

What has brought about this great improvement? I should say, speaking from my own observations and acquaintance with this work, that it was the use of the "spectral chart" in conjunction with suitable diaphragms.

Certainly there are many other factors to be taken into consideration in this great advancement in American color work, but to the elliptical stop in connection with the spectral chart belongs the principal post of honor.

Neither round, square, slot or star shaped diaphragms were capable of filling the requirements called for in phusochrome reproductions. When the spectral chart and elliptical diaphragm entered into the work, the screeny texture fled from our color work forever.

The old single cross-line system could not reproduce the delicate tints and colors of the original, owing to the weakness engendered by the large admixture of white in the tints or colors of any order.

Again the crossing of the attenuated lines in these tints gave a crude screeny effect to the work, with the corresponding weakness in those color values.

By the employment of cross-line screens, with the lines running vertically and diagonally as seen in German work, the color values in the lighter tints and shades were secured, but at the expense of power and force in the primary and secondary shades of these colors.

The elliptical diaphragm enables us, however, to reproduce any color subject whatever in its exact colors. That is, when used in conjunction with the phusochrome chart, to guide us in securing true values in each individual color negative.

Should the reader care to inspect the frontispiece to this issue, at the same time using a strong magnifying glass, he will observe the following:

The soft and delicate color tints are composed of a very fine stipple or grain. This effect it is impossible to obtain by the use of any single-line method, or cross-line method, without the employment of the elliptical diaphragm.

It will also be noticed, as the print is further inspected, that this stipple becomes more pronounced, partaking of the nature of a dot and single line in the firmer coloring.

I think it requires no demonstration of a lengthy nature to show the enquiring mind that such a system is entirely novel, and at the same time most excellently adapted to the end in view, viz., truthful rendering of color subjects.

By the use of such a system in obtaining the half-tone negatives for the color plates, and the employment of the "spectral phusochrom chart" in conjunction with the original when making the color value negatives, the reproduction will be found faithful in its color delineations, and free from all screeny appearance.

The "watered" and "diapered" effect so often noticed in otherwise good color work is absent, the print approaching the creation of the artist as near as 'tis possible to come.

Concluding, I think the use of the phusochrom chart when photographing the color subject, and the judicious handling of the elliptical diaphragm in making half-tone values from the above, will do much to raise the standard of the earnest, practical color worker.

Northport, Washington. Macfarlane Anderson.

* * *

Porcelain Pictures.—Burnt-in pictures on porcelain are recommended by A. Fuhrman as a substitute for regular photographs to be deposited with other documents as a memorial in the corner-stones of newly erected buildings. The period of durability of the ordinary photograph is limited, while a burnt-in enamel will last forever.

* * *

A New Comer.—Photographisches Central-Blatt is the name of a new photographic journal, edited by F. Schmidt, of Karlsruhe, Baden. The first number is to hand and is a very good-looking publication, giving terse reviews of the most important proceedings in the photographic world, and thus will prove a most acceptable addition to the many German photographic publications.

SOCIETIES

PORTLAND CAMERA CLUB.—The following officers have been elected at the annual meeting of the Portland Camera Club: President, Dr. Scott Gilson; Vice-President, F. W. Woodman; Secretary, F. H. Collins; Treasurer, Clayton Whipple; Librarian, J. H. Lamson.

Executive Committee: George Owens, Fred. Fox, F. H. Lawrence, S. P. Warren.

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NEW YORK CAMERA CLUB.—At the annual meeting of this Club, held on the 8th day of January last, the following officers and trustees were elected to serve for the ensuing year.

President, William D. Murphy; Vice-President, Franklin Harper; Secretary, Harry B. Reid; Treasurer, Robert J. Devlin; Librarian, George Trowbridge. Board of Trustees: William D. Murphy, Franklin Harper, Harry B. Reid, Robert J. Devlin, Carlton W. Nason, Charles W. Stevens, William J. Cassard, J. Arthur Booth. Committee on Admissions: George Trowbridge, Chairman; William Bunker, William A. Frazer. House Committee: Carleton W. Nason, Chairman; John V. Van, J. Arthur Booth, George Lorillard Ronalds, E. R. Musgrave. Committee on Lantern Slides and Exhibitions: Franklin Harper, Chairman; William A. Fraser, William Bunker, W. B. Post, Henry A. Blyth.

There will be about six lantern-slide exhibitions given this season, but up to this writing there has been only two dates fixed, viz.: March 30th, Professor Albert S. Bickmore, "Niagara Falls Views and Studies." April 6th, Professor Dwight L. Elmendorf, "Italian Impressions,"

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DEPARTMENT OF PHOTOGRAPHY OF THE BROOKLYN INSTITUTE.—The evening of January 24th was devoted to the exhibition of slides, loaned by the Orange Camera Club.

The regular monthly meeting of the Department was held at the Art Rooms, on Montague street, on January 27th, the lecturer of the evening being Mr. Ernest Edwards, of the New York Photogravure Company, who spoke upon the "Three Color Printing and Other Processes." The lecturer gave an explanation of many of the photo-mechanical processes now in use, all of which, he said, were based on the action of light upon a bichromate in gelatine—the speaker going over them all as carefully as the limited time would permit—the lecture being illustrated with numerous lantern slides and pictures made by the "Three-Color Process," showing the three stages through which the picture passed before it was completed.

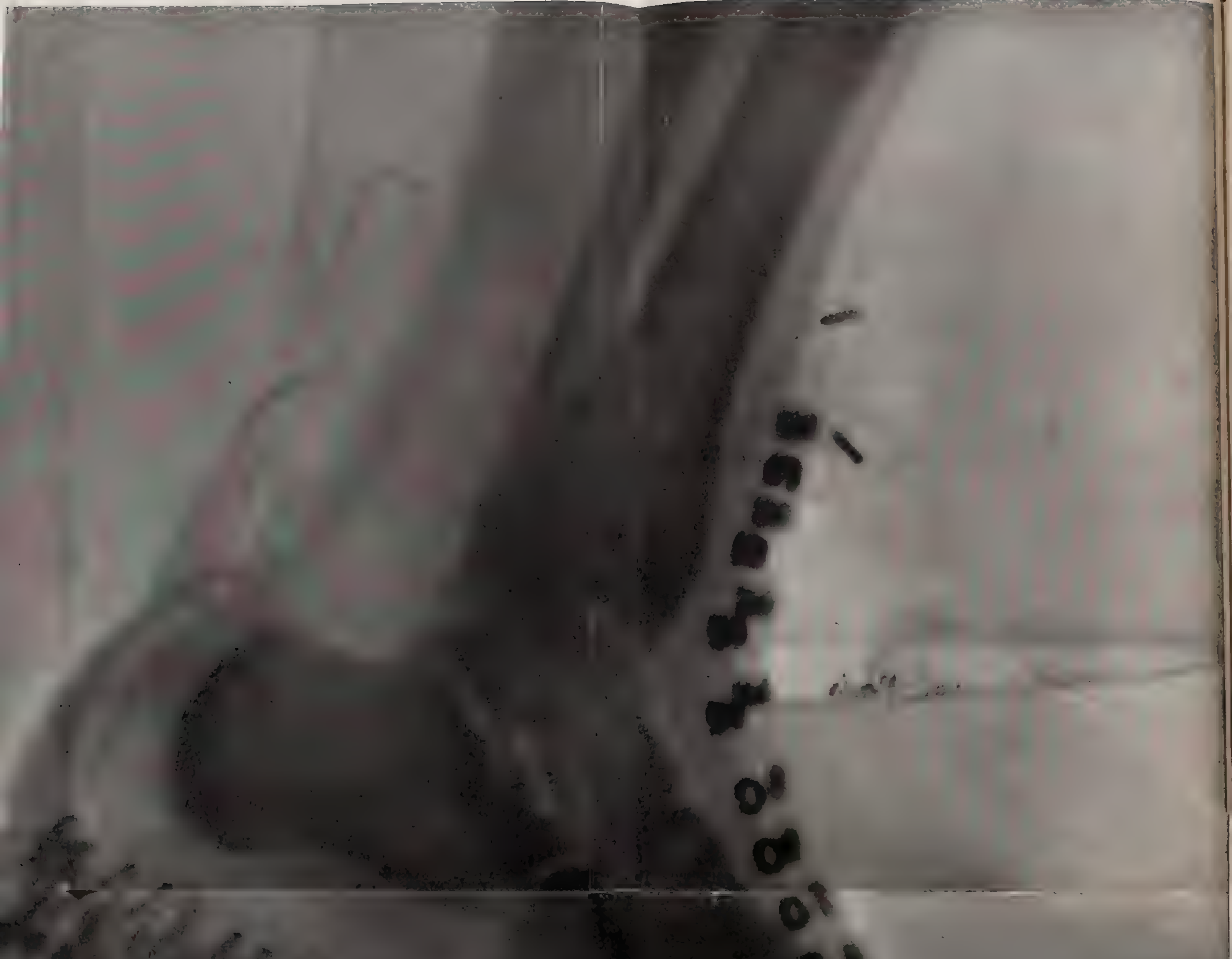
After the lecture a number of pictures were printed on a press and distributed among those present; in this way giving a practical demonstration of the "Three-Color Process."

On January 31st, Mr. Arthur W. Dow, of Pratt Institute, gave a lecture on "Composition in Landscape and Portrait Photography," the lecture being illustrated by a number of very fine slides and blackboard sketches.

Dr. L. E. Meeker gave an illustrated talk on "California," on February 7th, at the rooms of the Department.

The monthly print exhibition was held on February 14th, the members exhibiting their work of the past summer.

If it be found practicable, classes in retouching and lantern-slide coloring will be started this coming spring. All members desiring to join either of the above classes will please communicate with our corresponding secretary, G. W. Hart, 849 Monroe street, Brooklyn, for further information.



RÖNTGEN SHADOW

MADE IN NIKOLA TESLA'S LABORATORY

Supplement to
Anthony's Photographic Bull

ANTHONY'S

Photographic Bulletin.

EDITORS:
Prof. CHARLES F. CHANDLER, Ph.D., LL.D.
FREDERICK J. HARRISON.

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REFLECTION OF THE X RAYS.

SERIOUS work in connection with the X rays has resulted in the establishment of the fact that they undergo reflection from a platinum surface. As our readers are aware, scientific work on the rays has been carried on by Prof. Rood, and the Bulletin has had the privilege of being present during the carrying on of this research work. Prof. Rood uses a current of 6 ampères and a spark 5 inches in length, with an ordinary Ruhmkorff coil 12 inches long and 5½ inches diameter. On March 9th results were obtained that demonstrated that the X rays were reflected from a polished platinum surface, placed at an angle of 45 degrees. In the experiments made in order to confirm these results every precaution was taken to exclude all error, and on March 13th satisfactory negatives were obtained, establishing conclusively that the X rays undergo reflection.

By following the test with a barium platinocyanide screen, as described in this issue of the Bulletin, that part of the tube richest in X rays was found. The plate-holder, with slide in position, was completely covered with a plate of aluminium 0.17 mm. thick. The central portion was then covered with another strip of aluminium of the same thickness, and over the whole was fastened an iron-wire netting, to furnish the image. All direct light from the tube was screened from the plate-holder by a sheet of lead. The platinum reflector and plate-holder being arranged so that the reflector was at an angle of 45 degrees to the source of maximum X-ray radiation from the Crookes tube, the current was turned on. After an exposure of ten hours the plate was developed, and a good image of the wire netting was obtained. It should be here again pointed out that the plate was protected by both the slide of the holder and by the aluminium cover. The image was somewhat irregular. In some parts the vertical lines were the more distinct, while in others the horizontal lines were dominant.

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To ascertain the approximate percentage of reflection, a plate was exposed to the direct action of the rays from the Crookes tube, and the exposure tested, until in the same developer and under similar conditions a negative of similar density was obtained. The result arrived at was that platinum foil, at an angle of 45 degrees, reflects $\frac{1}{260}$ part of the rays incident to it. The establishment of the fact that the X rays undergo reflection is important, pointing, as it does, to the conclusion that the rays are very similar to other forms of radiant energy, such as light and heat.

In another experiment in this connection, a much larger tube was used, and in the resulting negative only the horizontal lines were visible, and these were much more blurred than those obtained with the smaller tube.

RÖNTGEN'S X-RAY PHOTOGRAPHY.

THE interest manifested in the wonderful results achieved and achievable by the aid of the so-called X rays shows no signs of diminishing. Indeed every day adds to the wonder in the minds even of scientists, who are presumed to be prepared for anything and everything. In our March issue we dealt at some length on this subject, and presented our readers with many wonderful illustrations, and with articles by many authorities. A brief recapitulation, with additions embodying the results of further research, will, doubtless, be welcome.

Necessary Apparatus.

An electric current, furnished from the street or from a battery, is necessary. The battery may be the ordinary bichromate battery, each cell consisting of a vessel containing a saturated solution of bichromate of potash, mixed with strong sulphuric acid, in which solution is immersed a plate of zinc flanked on its two sides by strips of carbon. If the street current is used, care must be taken not to employ too great a current, or trouble will occur in the next necessary piece of apparatus—the induction coil. A current of about 7 ampères should be used, but the tyro should consult an expert before risking any rupture of the coil. Of course, when the apparatus is purchased complete, no danger need be apprehended. The induction coil should be capable of giving a strong spark of from 4 to 6 inches in length, and should be carefully handled. The next essential piece of apparatus is the Crookes tube itself, and here is where trouble is likely to occur unless care is exercised when purchasing. We have refrained from using these columns, even indirectly, as an advertising medium, but our recent experience has been such that we feel it our duty to warn impending purchasers against investing in the so-called Crookes tubes that are now being offered for sale by parties who do not guarantee them. Our publishers have a supply of tubes on hand, and a photograph showing work actually made with the tube is included with every tube sold. A Crookes tube is a sealed glass tube from which the air has been exhausted so that the pressure is only one-millionth of an atmosphere, and at or near the ends of which are sealed two platinum wires. Unless this extreme degree of rarefaction is reached, the tube will be found useless for X-ray work. We have for the past three weeks been testing many tubes from various supply houses, and in no single instance have the effects of X rays been observed. The tubes showed at the first passage of the electric current a slight green fluorescence, but in a few minutes this gave place to a milky, bluish fogginess, and exposures of two hours failed to give any trace of image on a photographic plate. Some tubes showed less of the fogginess and more of the green fluorescence than others, but in no case where there was a trace of the foggy appearance were the X rays developed. The cause of this was apparent. The tube was not by any means sufficiently exhausted of air, and the fluorescence and subsequent fogginess were explained by the fact that air sticks tenaciously to glass, and, unless the tube is warmed or electrically excited while still on the pump, this air will be given off when the tube is connected with the induction coil, and thus the vacuum will be lowered. Again, the obtaining of a vacuum, such as is necessary for this work, is a study requiring careful attention, and, in the hurry to supply the enormous demand for these Crookes tubes, the quantity turned out has been at the expense of quality. Our expe-

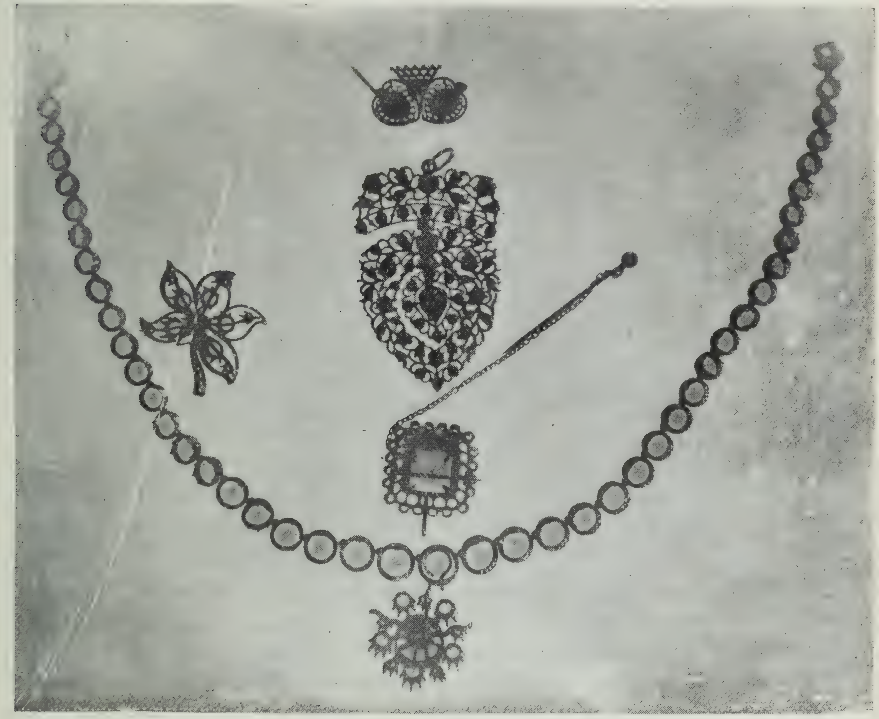


Photo by W. W. Griscom, showing transparency of diamonds to the X rays. Reduced one-half.

Top in center. Two emeralds surrounded by diamonds, and a diamond crown.
Silver shield and crown with diamonds.
Left: Emerald in center, and ten diamonds.
Large diamond set in brilliants.
Diamond necklace.

rience in this direction was confirmed by Professor Rood, who only obtained satisfactory results with tubes of foreign manufacture. However, Crookes tubes may now be purchased of guaranteed reliability. The three essentials are, therefore, battery, induction coil and Crookes tube. With these we can proceed to work.

The battery is connected to the binding screws on the bed of the induction coil, and the other two screws of the coil are connected by wires to the platinum wires of the Crookes tube. In the Crookes tubes as now sold, the cathode or negative pole is in the shape of an aluminium disk, and it is from this disk that the rays proceed. As shown in our last issue, it has long been known that the rays proceeding from the cathode possess certain remarkable properties. It has, however, been pretty conclusively demonstrated by Professor Röntgen and others that the cathode rays differ materially from the X rays formed after the impact of the cathode rays on the end of the Crookes tube. Hence the name X rays, X being the unknown quantity in algebraical calculations.

TESTING THE CROOKES TUBE.

Having, now, a complete apparatus, the efficiency of the Crookes tube may be tested in two ways :

First, Photographically.—A plate is placed in the plate-holder, and on the outside of the slide sundry objects may be distributed. For example, a piece of glass, coins, a strip of aluminium foil, and perhaps a piece of wood with nails driven into it. The holder is placed at a distance of 5 or 6 inches from the end of the tube, opposite the aluminium disk or cathode, and the current passed through the coil. The question as to whether the current is going into the tube in the proper direction is easily ascertainable, even to the uninitiated. If the whole tube is lit up with a greenish glow, the current must be reversed. When a stream of light from the disk towards the end of the tube is visible, with rings of green light around that end, the current is passing in the desired direction. After one-half hour exposure the plate may be developed, and should show considerable signs of action. The nails in the wood should be distinctly visible as white marks on a dark ground ; the glass should be white on a dark ground, and so should the coins, while the aluminium foil should be practically invisible, as aluminium is transparent to these X rays.

Second, by Barium Platinocyanide.—A much quicker, and quite as efficient, method of testing the efficiency of the tube is by taking advantage of the property possessed by the X rays of exciting barium platinocyanide to the point of luminosity. Professor Rood's method is as follows: A few crystals of this latter substance are fixed upon a card by the aid of a little shellac, the whole tube is covered with a black cloth, and the room is darkened. The barium platinocyanide is now as invisible as the apparatus. On turning on the current and bringing the barium platinocyanide near the end of the tube from which X rays are presumably emanating, a luminosity of the platinocyanide may be accepted as evidence that X rays are present, and conclusive proof is established if the luminosity is not greatly diminished when a book or pine board, or even the hand, is placed between the covered end of the tube and the card bearing the barium salt.

This method affords a ready test of the presence of X rays, and is one we would recommend to manufacturers of Crookes tubes. This phenomenon, our readers will remember, was pointed out by Prof. Röntgen in his paper which was printed in our March issue.

Applying the X Rays.

Having an apparatus which will produce X rays, their particular application must be left to the individual. We need hardly point out that this well-termed "New Photography" is still in an embryonic state. Its applications are apparently innumerable. Few, indeed, are aware of the enormous strides that have already been made by certain ardent experimenters. It suffices to say that results have been obtained that cannot fail to be of the highest possible value in surgery. We have seen photographs of the human trunk showing every rib perfectly defined; of the lower part of the leg and the foot in which every bone was absolutely clearly delineated, while the outline of the shoe and the nails in the heel and sole were marvelously clear and distinct; of the arm and hand, and of the knee-joint. In all of these photographs the opacity of the flesh counted for nothing; indeed, the flesh was indicated by a slight veiling, as if the bones were simply covered with a very transparent skin. Further, we have seen these pictures made with the tube at a distance of 50 feet from the plate-holder, and have marveled. To the amateur photographer, with his abundance of time and his splendid enthusiasm, belongs, perhaps, the honor of practically developing this wonder of the nineteenth century. But he must remember that he must read up a little on electrical matters, and devote his energy to the production of useful results, rather than to a constant repetition of simple experiments. All these experiments may be carried out with currents that are perfectly safe, and it should be remembered that Professor Rood's difficult work on the reflection of the X rays was made with a current of only 6 ampères and a spark 5 inches long, with a plain Ruhmkorff coil 12 inches long and 5½ inches diameter.

Much nonsense has been written regarding this X-ray photography, both in the newspapers and in some photographic journals. The fact, however, remains that the sensation caused has been justified by the facts, and it has been and will be our endeavor to present our readers in this and subsequent issues with facts, and those the very latest.

X RAYS IN PROFESSIONAL PHOTOGRAPHY.

THIS question has recently been put to us by professional photographers: "What application has this new Röntgen photography that can be utilized by professional photographers?" Without presuming to endeavor to point out every advantage that may be derived from the discovery of Prof. Röntgen, we would first suggest to the professional photographer that the much-wanted boom in photography has set in, and may be traced directly to the advertising that photography has derived from the enormous interest created by this X ray discovery.

The advent of the amateur was lamented by some photographers, who have lived to see the day when the enormous demand for apparatus and supplies has improved and cheapened necessary articles to an extent hardly dreamed of. The widespread interest manifested now in this latest affiliation of electricity and photography cannot fail to work an improvement in many directions, and should therefore receive the careful attention of every professional photographer. At present he can utilize the discovery in two ways.

First, as a legitimate source of income. We have during the past few weeks been frequently solicited by medical men to make X-ray pictures of various surgical cases, such as splinters of glass in the hands or feet of patients, calcareous deposits in kidneys, and so forth. The fact that no photographer in the city has been equipped with the necessary apparatus has surprised the doctors, and unless the matter is taken up soon by our profession, the doctors will attend to the matter themselves, and a remunerative source of income will be lost to the photographer. The outlay is not great, and the returns are sure. Again, why not try X-ray photography on the ordinary individual? The human is a queer creature, loving the sensational, and would pay a good price for an X-ray picture of his hand or foot.

Secondly, as a means of unique advertising. The photographer's great trouble is the fact that he has but few means of impressing people with the fact of his existence and his location. He places a showcase at his door, but the general public are used to the ordinary showcase, and bestow but little attention on it. Our publishers have recently been exhibiting a number of X-ray photographs in their show window with the result that the sidewalk has been blocked. Moral: Make some X-ray photographs and so make your showcase a novel attraction. Again, make an attractive display of your work in your reception room, and give an "Evening with Prof. Röntgen" once a week. The intelligent crowds will come. There are opportunities connected with X-ray photography that the professional photographer can hardly afford to neglect.

❧

THE HUMOR OF IT.

MUCH has been published regarding X-ray photography that partakes of the humorous, and much that is nonsensical has been quoted, even by scientific journals. The wildest possible statements have been printed without any regard to accuracy, and the public may well regard with feelings akin to alarm this so-called new photography. For example: "Armed with this light and a camera, a man might go around town taking snap shots at other people's brains and stealing their ideas." "How much worse will it be when the merciless instrument has the power of piercing, not only one's clothing, but the flesh as well?" "It will certainly be necessary in the interests of humanity to restrict very materially the license enjoyed now by the owners of cameras." "In his opinion it was the invisible rays at the violet end of the spectrum which kept color photography from being now in everyday use. What he hoped from Prof. Röntgen's discovery was that photographic inventors would be able to use it so as to exclude the visible rays from the camera." "It puzzles me to understand how an object enclosed in a box could be photographed, for the simple reason that the box is opaque, that is, impervious to light. There's an obstacle that has to be explained away before you can go any further."

The newspapers have published wonderful pictures of skeletons and scared the credulous into the belief that cast-iron clothing will be necessary in the near future. X rays have been found in candlelight, in no light at all, and altogether the sensation has been worked pretty thoroughly. But out of it the fact remains that the discovery is a marvelous one, calculated to play an enormous part in the development of the arts and sciences.

X RAYS IN GERMANY.

PROF. GOLDSTEIN and Dr. Schulze-Hencke have tried the X rays on various kinds of wood, and, among others, have experimented with pine, elm, mahogany and black walnut. In every case the grain of the wood was plainly visible.

Prof. Salvioni has made the X rays visible to the human eye. This is not new, having been previously demonstrated by Röntgen and others. Salvioni attaches to the front of a telescopic tube a piece of cardboard coated with a fluorescing substance. On looking into the properly adjusted tube, and permitting the X rays to fall upon the cardboard, the fluorescing material will become luminous at all points reached by the X rays.

Prof. Giessler, of Bonn, writes: "A great obstruction to the employment of the X rays for medicinal, and particularly for surgical, purposes, would be removed if the time of exposure could be materially shortened. This gave me the idea of employing the fluorescing action of the X rays so as to increase their action on the sensitive plate. I coated a piece of paper with various materials, and was particularly successful with chloride of iron and uranium nitrate. The dry plate was immersed in a solution of chloride of iron, and a much better image was obtained. This indicates a method by which a systematic series of experiments might be made to determine the best way of increasing the action of the X rays."

Keussen states that the time of exposure is considerably shortened if the sensitive plate is heated. A picture requiring under ordinary circumstances an exposure of thirty minutes needed only fifteen minutes at a temperature of 40 degrees Celsius.

Eder and Valenta have tested the behavior of different sensitive films to the X rays. They say: "Gelatino-bromide of silver emulsions and mixtures of these with iodide or chloride of silver are sensitive. Pure gelatino-bromide of silver emulsion gives the best effect. Dry and wet collodion plates showed but little sensitiveness."

Under the direction of the Secretary of War in conjunction with the staff of the Charlottenburg Institute, experiments were made as to the feasibility of employing the X rays for military and surgical purposes. Several pictures were made of anatomical specimens in which bullets were hidden in the muscular tissues and bones. The photographs showed distinct images of the injured parts, and the bullets could be easily recognized.

Schulze-Hencke, of Berlin, is said to have utilized the X rays in distinguishing between genuine and imitation pearls. After an exposure of forty-five minutes the genuine pearls showed as a dark opaque mass, while the imitation pearls were indicated by transparent spots.

It is further stated that charcoal, anthracite, jet, or genuine diamonds, if placed on a sensitive plate with imitation jet and diamonds, and subjected to the X rays, will show so distinct a difference as to render the imitation stones easy of detection. All forms of carbon are very transparent to the rays, while the imitations are practically opaque. In the genuine jewels only an image of the metal mounting is obtained, while in the imitations the stones appear as distinctly as the mounting.

Henry Dietrich.

X RAYS AND PSEUDO EFFECTS.

To the Editor of the Bulletin :

Dear Sir,—If not out of place, may the writer have a few words on the subject of the X rays, calling attention to some points distinctly photographic?

This remarkable discovery, which marks an important epoch in the history of science, and places its discoverer among the illustrious scientists of the world, is a striking example of the inestimable value of photography in scientific research. These same X rays have been produced thousands of times in the laboratories of our technical educational institutions, and would have, in all probability, remained unknown had not the science of photography happened to have its silent faithful observer present, by chance, to record their existence and make visible their effects. More credit is due photography than has been accorded it for the reason that the discovery was not the result of any supposed theory worked out, but the result of accidentally having the sensitive photographic plate present. All honor to Prof. Röntgen, and to the science of photography also.

It is somewhat of a surprise that, from the widespread interest manifest and the great number of distinguished scientists giving their attention to the subject, no additional contributions have been made to the first results of the discoverer. All appear to be satisfied with repeating Röntgen's first results. To secure photographs through opaque substance has been so wonderful that the experimenters have rested on their oars at this point.

According to reports, the source of the X ray is not confined to the Crookes tube, but may be found in the sun, electric light, oil lamp, etc.

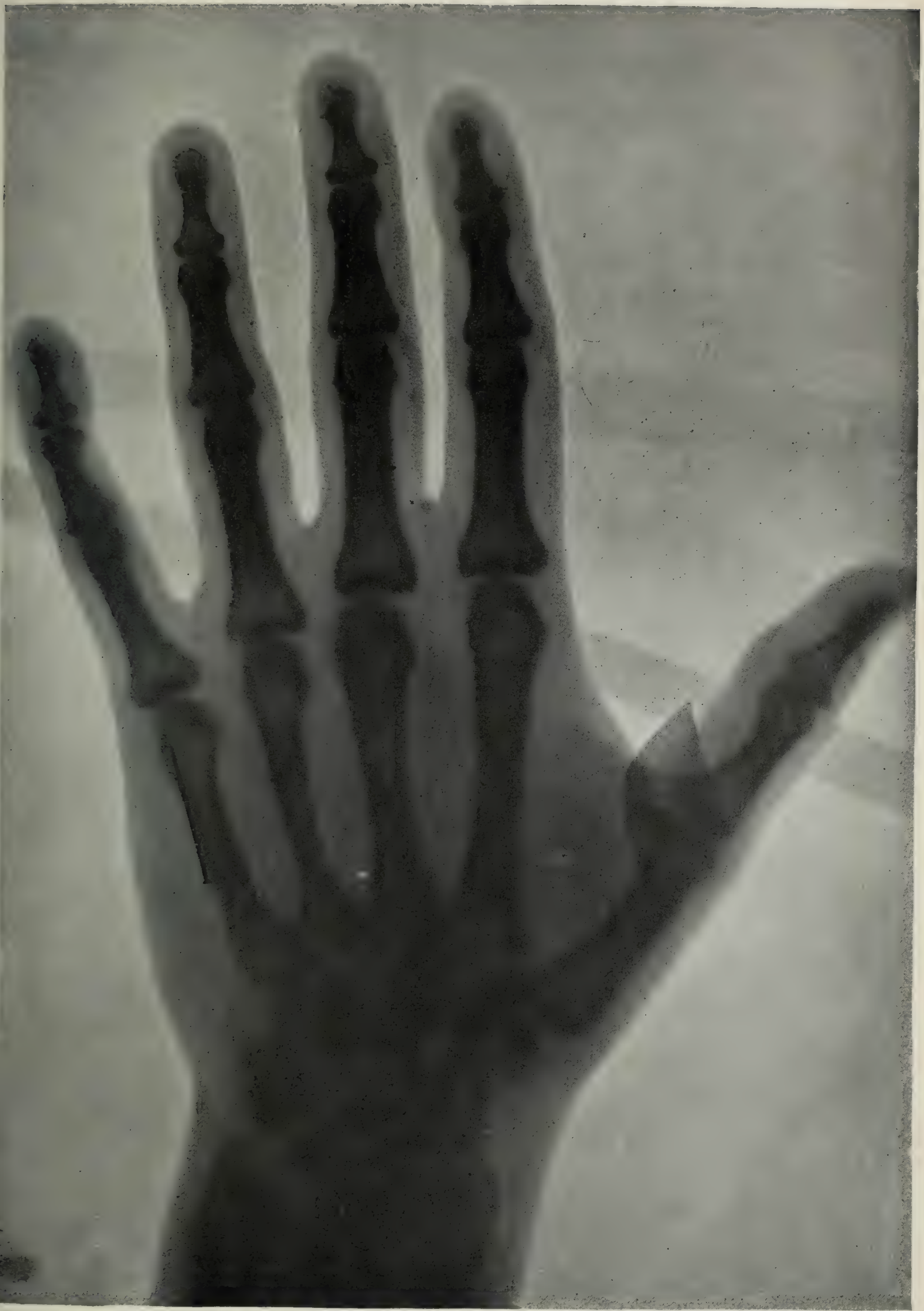


PHOTO BY W. W. GRISCOM.

FEMALE'S RIGHT HAND.

Glass showing through bone of thumb. Pin showing through metacarpal bone. Two rubber bands over fingers.

If this mysterious energy is so widely distributed photography would be a most difficult art and science to practice.

A rational and plausible explanation to account for these numerous reported sources of the X rays would be, that many of the experimenters had no knowledge of photography, and attributed any and every result they secured to the X rays which should have been charged to actinic light reaching the sensitive plate through leaky plate-holders.

The sensitive photographic plate is not a substance to be used with impunity, and in seeking for sources of the X rays careful precautions must be taken to eliminate any possibility of actinic light reaching the photographic plate if the results are to be worthy of any consideration. Future experimental work with the X rays in which photographic methods are employed must be conducted with a clear understanding of the science of photography.

Exposures made by the writer varying from one-half an hour to six and one-half hours to bright sunlight failed to give any effect whatever on the photographic plate; from one-half to two hours to a 2,000 candle-power arc light (the plate-holder 1 foot from the light) also gave no effect. Other reported sources were tried, but with no result.

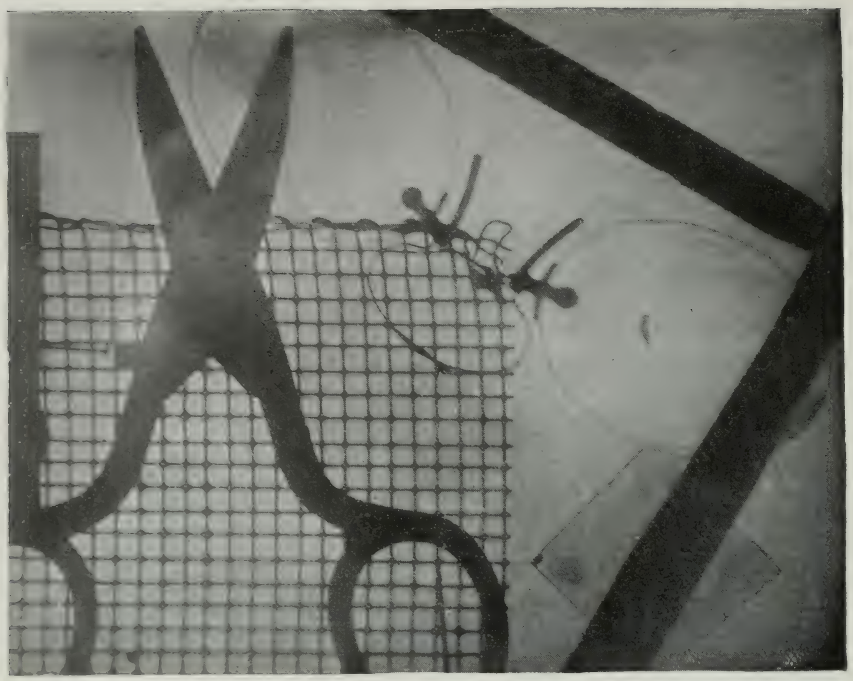
In all the experiments the photographic plate was wrapped in five thicknesses of Dennison's orange tissue paper before being placed in the plate-holder, as a safe precaution from actinic light, which might possibly leak into the plate-holder. A piece of glass was used in all experiments for the reason that it checks to a large extent the passage of the X rays, but offers almost no resistance to the passage of actinic light.

With the precautions mentioned, good results were obtained from the Crookes tube in twenty minutes, but from the other-mentioned sources the results were failures, as far as photographic action was concerned, which might assure the conclusion that other-reported sources are open to suspicion.

In reference to the published conclusions of a noted worker in electrical science that slow plates were more sensitive to X rays than the fast ones, it is safe to say that the conclusions were false. The illustration in the published article exhibited the results obtained by placing strips of photographic plates of different sensitometers in the same plate-holder over which was placed a piece of metal partly covering each strip of the photographic plate. The plate-holder thus arranged was exposed to the Crookes tube for a certain length of time. Upon development it was found that one of the low sensitometer (slow plate) strips gave the best results. From this the above conclusion was evolved.

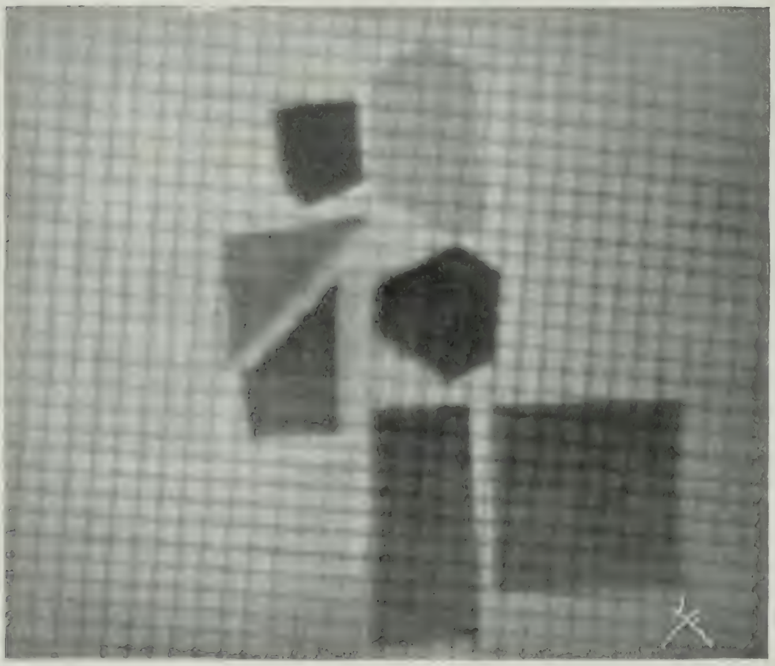
To those who have studied the science of photography this fact is known, that for a plate of a certain sensitometer an exposure of a certain duration of time for a given condition of light produces the best negative; if the exposure is increased up to a certain point the result is not a negative, but a positive; that is, the primary effect of the light is reversed by a long exposure.

The result of this unexplained action of light is to produce thin



PSEUDO-RÖNTGEN PHOTOGRAPH.

By H. S. Curtis. Exposure of two hours to ordinary sunlight, through ebonite slide.



(Showing Prof. Rood's method of accurately gauging relative opacities to X rays.)

negatives where the reversal action is only partial. Practically the term over-exposure is given to this effect.

In the experiment above referred to, the weak results secured on the strips of the fast plates must have been due to this reversal effect, and not that the fast plate was not as sensitive to the X rays as the slow one. One thing noticed in the illustration is, the strip of the slowest plate gave a result about the same as some of the fast-plate strips, which strengthens the criticism that the conclusions arrived at by the experimenter were false.

In conclusion, let us hope that serious research will claim future attention of experimenters who will demonstrate that the X rays will further all branches of science, and mankind in general.

Jos. N. Bradford.

Ohio State University, March 9, 1896.

THE FLUOROSCOPE.

THE fluoroscope is the name given by Mr. Edison to an arrangement intended to render useful the property possessed by the X rays of exciting to luminosity certain substances. Prof. Röntgen, in his original paper, pointed out that barium platinocyanide became luminous when brought in the track of the X rays. Salvioni, placing some crystals on a card and fastening the card to a tube, the inside of which was blackened, was able to study the effect of the interposition of various materials between the Crookes tube and the card. Edison, it is announced, has been investigating along similar lines, and has found calcium tungstate to be superior to the barium platinocyanide.

The fluoroscope is a conical box with felt adjustment for the eyes. The bottom of the box may be of cardboard, cloth, or wood, and should, with the rest of the box, be blackened. On the inner side of the bottom is placed a layer of calcium tungstate crystals, these being retained in position by a matrix of collodion. The current being turned on and the Crookes tube excited, the fluoroscope is directed towards the end of the tube, when it will be seen that the bottom of the box becomes luminous, even if a board an inch thick is interposed. On placing the hand between the tube and the fluoroscope a very indistinct outline of the bones may be seen. Objects such as keys and coins stop the rays, and their presence is clearly indicated. There may be a great future for an instrument of this description, but considerable improvement must be made before it can be truly practical.

The great want at present is a means of converging the rays. Again, but little is at present known regarding the best form of tube, degree of vacuum, shape of cathode disk, position of anode, kind of sensitive plate, backing for such plate, and so on, through all the details. A calm survey of the present state of knowledge regarding the new photography reveals the fact that practically nothing has been added to the principles enunciated by Prof. Röntgen.

Items of Interest

CHAPMAN JONES, in *Photography*, remarks: "We may well ask whether the X rays produce the developable action in gelatino-bromide plates by their direct action or by a secondary action. Is, for example, the plate sufficiently fluorescent to be excited by the X rays into luminosity, or, if not to luminosity, perhaps the excitation results in the production of invisible (say ultra-violet) rays at the surface of the plate, and then these affect it as we know they do. If this kind of secondary action takes place, we may not have here sensitiveness to any new force, but merely the production of the new force of radiations which we know are photographically active, and we shall then have no new fundamental principle to add to our knowledge of photography. On the other hand, light is only a form of energy; it is stated that the developable condition can be induced by other forms of energy, such as pressure, contact with certain chemical bodies, heat, etc., and if the X rays act directly in producing the developable condition, we shall have to add another form of energy to those we know to possess this power. * * * Photography is already the recorder of facts; it will, perhaps, develop eventually into being the recorder of forces."

◆

X-RAY photography, shadowgraphy, electrography, skotography, sciagraphy, fluorography, cathography, cathode photography and radiography are a few of the names given to the new photography.

◆

SOME of the X-ray pictures that have been published bear many signs of retouching. This supplementing of the work of the rays should be avoided, and only actual results recorded. Other pictures are of little value in that they can be readily duplicated without the use of X rays.

◆

DURING the development of many X-ray photographs we have noticed that the developing action rapidly proceeds through the film, and is more intense near the glass support than at the surface. This may confirm the theory advanced by Captain Abney that the rays act first by setting up phosphorescence, or action of some kind, in the glass at the back of the sensitive film. An interesting experiment might be performed with a gelatino-bromide of silver film, entirely separate from any support except at the sides.

E. W. Foxlee says: "Composition properties, balustrades, steps, and the like, can easily be restored by giving them a coat of flatting color, as follows: Mix together white lead, drop black and a little venetian red, or other coloring, according to the tint required, with sufficient turpentine and a little dryer to make it about the consistence of ordinary paint; then add about one-third the bulk japanners' gold size. It is applied in the same way as paint, though, if there are any large plain surfaces, those parts should be lightly stippled over with a dry brush. This flatting dries dead, is easily applied, as it dries very slowly as compared with the usual turps flatting, and it wears well. If there are any chipped places in the 'compo,' they should be touched over with the color the previous day. If the things are in a bad condition, it will be advisable to give them a coat of paint before they are flatted. If the properties have been done in distemper color, the same should be used in their renovation. It is made thus: Whiting, drop black, and any other color, according to requirement, are mixed together with water to the consistence of thick cream. Then sufficient double size, of the oil shops, is added hot, to form a thin tremulous jelly when cold, in which state it is applied. It should be laid on thickly, and quickly worked even with the brush. Plain backgrounds can also be re-done, either with the flatting color just described or with the distemper. A coat of Brunswick black, or of the flatting color, will make the head-rests look equal to new."

* * *

"Holland blinds are best replaced by new ones. Washed blinds seldom run well on the rollers, and always hang more or less saggy. They are not very costly, and the old ones will cut up for dusters, etc. Woolen curtains are best dealt with by the dyer. If they are simply dirty, they should be cleaned only; if faded or stained, they must be dyed, but it should be stipulated that it be done with a permanent dye. Before the curtains are re-hung, the rods should be well blackleaded—it will greatly facilitate their running. After the carpets have been thoroughly beaten and relaid, if they be scrubbed over with cold water containing a little oxgall and then wiped with a clean cloth, the colors will be greatly revived. Only a small space should be treated at a time, so that the water may be prevented from soaking through. Oilcloth may be much improved in appearance by rubbing linseed oil well into it, after it has been thoroughly cleaned by scrubbing with warm water, soda and soap. Polished furniture may be dealt with in the same way as the cameras, etc. The unpolished furniture, if bare wood, should be glass-papered till clean and then have linseed oil sparingly rubbed over to darken it again."

* * *

All matter for the May issue should reach us on or before April 18th. If proofs of advertisements are required, copy should be furnished before April 15th.

THE WILD NORTHWEST.

TAP, tap, tap on the window pane ; faintly at first, then louder, until I hear and cry out "Whose there?" "It is I, Mr. Anderson—it's been snowing all night ; all the trees are heavy with snow."

"All right, Eddy," I answer, "get everything ready, and I'll be with you in half an hour."

'Tis seven o'clock, and a cold wintry morning in January. Locality, the Columbia River, near the British boundary line, where the Rockies, Selkirk and Gold Range are jumbled and tangled up among each other.

For weeks I had been prepared for such a morning—snow, after a warm chinook, resulting in beautifully carved and frosted trees dotting the mountains like frosted, carven silver.

THE DARK DREARY WINTER AND WILD DRIVING SNOW."

Photo by Macfarlane Anderson. Half Tone by School of Process Engraving.

All the previous winter I had watched and waited, but had not once been favored with suitable weather to obtain such an effect as I desired. Snow we had, indeed, and that in plenty, but it did not stick, and black trees, with white foreground, make but poor wintry effects.

By 8.30 we are all out, dogs barking, and the whole company laughing and talking, all at the same time.

Isn't it curious that the snow, in combination with mountain scenery—a clear frosty day, cameras, dogs and guns—makes one hilariously happy and exceedingly contented?

All night long "the stormy north sent forth the driving sleet and snow," and a few hours before daybreak, the cracking and snapping of giant pines and tamaracks in the forest told eloquently of the frost's severity.

Now we have left the beaten track, and push on through snow reaching nearly to our knees. We are gotten up for the occasion, however—heavy rubber boots and leggings protect us so well that we laugh at the cold.

ORE FROM THE GOLD MINES.

Photo by MACFARLANE ANDERSON. Half Tone by School of Process Engraving.

The mist comes driving along the mountain side, hiding and veiling all but the nearest objects. Here are some stray cattle browsing, or trying to browse, from off the bare brushwood. The white mist floats, twines, creeps and crawls around and through the trees. "What a weird effect!"

"Well, we'll try it." "Light's poor; no effect," says one. "Don't matter, I want a mist effect," says the hand camerist. The readers can see if he obtained it. The print, as a picture of the scene, we all liked, and, liking, vowed that a dark day, with mist and a hand camera, were, after all, not a bad combination with which to secure "The Dark Dreary Winter and Wild Driving Snow."

"Backwoods Trysting in Winter" was the title of a picture secured under somewhat similar circumstances, although later in the day and not so much mist. "A Miner's Mansion" had a mountain cliff, or bluff, as Westerners term it, rising abruptly behind it.

The mist in this instance also shows what can be done in changing the whole appearance of the surroundings.

I found that the sun was a hard subject to deal with in snow work, and also, whether the trees were bare of snow or crisply covered. Mr. Sun did not improve matters in the least, and more pleasing work could be obtained when his bright face was absent.

HUNTING WITH A MASCOT.

Photo by Macfarlane Anderson

Half Tone by School of Process Engraving.

"Elk, and the Last Shell," was taken in bright sunlight, as was also "A Northern Angelo." Much better results might have been seen in these plates had the sun kindly absented himself. As real snow days come seldom, however, the best we knew how was done under the circumstances.

The small plates were secured on Blair film, Poco camera, and I think some really excellent work can be done on films. Certainly they are handy, reliable and rapid.

Teams coming in with ore from the gold mines were also taken on films, the exposure being 1-15 of a second. It may probably interest your readers to know the plates I found most satisfactory in this work. I had ortho plates, process plates, rapid plates and dry collodion.

PHOTO BY MACFARLANE ANDERSON

HALF-TONE BY SCHOOL OF PROCESS ENGRAVING.

"A NORTHERN ANGELO."

The process plate furnished the finest results every time. There was very little to decide between it and collodion.

The developer was metol hydroquinone, although others, no doubt, are equally as good; only I like this combination, after two years' continuous usage in process, color work and in landscape.

The features which I consider of particular importance are the development of the plates, the filling of the holders, etc., which I carry out in as nearly absolute darkness as possible.

Only those engaged in the reproduction of colors for process work are, I think, aware of the extreme sensitiveness of any gelatino-bromide plate to any light. Let any color of light act upon such a plate for a given period, and the developer will generally manage to show the result.

Again, I have no doubt but that there are many who do not count their tonalities from clear glass up. As an old wet-plate hand, I do, and never find dry plates with too clear shadows.

Concluding, I suppose it is very much of the nature of the novice and the fiddle in all things, "When the master-hand came discord fled, and the fiddle found a soul."

MACFARLANE ANDERSON.

COLUMBIA LODGE, Northport, Wash.

WASHINGTON SALON AND ART PHOTOGRAPHIC EXHIBITION OF 1896.

A PRESENT tendency of photography, especially among amateur workers, is in the direction of artistic production, and a distinctive school of art work is rapidly developing.

This has been recognized abroad, and now the London Photographic Salon annually shows the steady progress made in pictorial photography. Appreciating these facts, the Camera Club of the C. Bi. C. purposes to establish, in connection with its annual exhibition, a photographic salon for the encouragement of all honest workers who possess artistic feeling and who are striving to produce, by photographic means, pictures in the best sense of the word.

ANNOUNCEMENT.

The Camera Club of the C. Bi. C. will hold its Second Annual Art Photographic Exhibition and First Washington Salon, May 26th to 29th, inclusive, 1896, at the Assembly Hall of the Cosmos Club.

EXHIBITORS.

The exhibitors will be members of the Club, and such leading photographic art workers as may be invited by the Club, through the Exhibition Committee. A carefully selected list of names has been prepared, and the invitations are limited. All work submitted by Club members and those invited will be subject to the rules hereinafter set forth.

CLASSES.

Two classes will be established, and exhibitors will indicate the class in which each entry is made.

Class A.—This class is designed to comprise the Salon, and will consist of such pictures only as possess special merit from an artistic standpoint; showing a definite artistic aim as regards choice of subject and composition, effects of light and shade, softness, and other points that will identify them as works of art, all considerations relating to photographic technique being eliminated, though a knowledge of technique is recognized as essential in the production of any picture. This class will include work which may be termed "impressionist," if produced intelligently and with a definite art aim.

Class B.—Photographs of merit, though not of sufficient artistic excellence to be admitted to the Salon. In this class special attention will be given to technique, clean and nice mechanical manipulation, and good judgment in the selection or arrangement of the subject. It will include all of the better class of the average exhibition work. The Committee wishes contributors to this class to feel that in itself it will be an exhibition second to none, in point of excellence, for general photographic work. Class B will be open to amateurs only.

Rules.

The entry blank, properly filled up, must be sent so as to reach the Committee not later than April 25, 1896. All pictures must be sent to "Exhibition Committee, Camera Club of the C. Bi. C., 409 15th street, Washington, D. C., and must be delivered not later than May 9, 1896. No entry fee or charge for wall space will be made.

All prints submitted and the negatives from which they are made must be the work of the exhibitor.

The Committee reserves the right to reject any pictures submitted which are considered unavailable, or to transfer to another class than that in which entered, if, in the judgment of the Committee, the exhibitor, or the exhibition, will be benefited by such change. Not more than ten pictures shall be submitted by any one exhibitor.

Each picture must be mounted or framed separately, and there is no limit as to size. All pictures sent by residents of the District of Columbia, for either class, and all work entered for Class A, must be framed, without glass. Pictures for Class B from contributors living outside the District of Columbia will be accepted unframed. The desirability of appropriate and artistic mounting and framing is emphasized.

The name and address of the exhibitor shall appear on the back of each frame or mount, together with title of picture and a number corresponding to that in the entry blank. No signature or other writing or printing will be permitted on the face of mount or print.

No reproduction will be made of any picture without special consent of the exhibitor.

All working up of photographs by hand, except mere spotting, is undesirable and may cause the rejection of the picture.

Previous exhibition of a picture, either in Washington or elsewhere, will not be considered in connection with Class A work, this being the first exhibition of the character held here.

Prints failing acceptance in Class A will be considered contributions to Class B—unless otherwise specially directed by the exhibitor.

All ordinary care will be taken of the exhibits while in the hands of the Committee, but responsibility for loss or damage cannot be assumed. All exhibits will be repacked and returned to exhibitors as soon as practicable after the close of the exhibition. Exhibits must be sent prepaid and will be returned at expense of exhibitor. It will facilitate early return and safety of pictures from out of the city if the covers of the boxes are fastened with screws in lieu of nails.

The decisions of the jury of awards will stand unalterable, after its written reports shall have been made to, and accepted by, the Committee. The judges or the Committee may request any information concerning any exhibit, and may disqualify for same being withheld.

Every exhibitor must be guided by these rules, and there can be acknowledged no appeal from the decision of the Exhibition Committee.

THE JURY AND THE AWARDS.

The jury will consist of five disinterested persons, not members of the Club.

Three artists, not photographers, will make the awards in Class A. The awards in Class B will be made by one professional and one amateur photographer, assisted by one of the artist judges. Awards in the two classes will be made at different times, and only the judges will be present when awards are made. It is designed that awards shall be made prior to the opening of the exhibition, and that the names of the exhibitors shall not be known to the judges until after their selections have been made.

In Class A two crosses will be awarded, known respectively as the gold and silver crosses of the Washington Photographic Salon of 1896. The gold cross will be awarded to the person exhibiting the most artistic picture. The silver cross will be awarded for the second best—but no picture entered by the winner of the gold cross shall be considered in competition for the silver cross.

There will be given to each exhibitor admitted to Class A a diploma signed by the artist judges and countersigned by the Committee. This in itself may be considered equivalent to an award, as the artist judges will pass upon the admission of the pictures selected by the Committee for this class.

The judges of Class B may award not more then ten certificates of equal value, for superior excellence. These certificates will be signed by the judges, and a blue ribbon will be attached to each certificate, with a seal, the award being known as the Blue Ribbon of the Washington Art Photographic Exhibition of 1896. The pictures securing this award will be decorated with the ribbon during the exhibition.

Receiving a diploma showing acceptance of pictures in Class A will not disqualify an exhibitor for the award of a certificate in Class B, but no exhibitor shall receive more than one certificate in Class B.

The two pictures awarded the gold and silver crosses, without their frames, will be retained for the adornment of the Club House of the Camera Club of the C. Bi. C., suitably marked with title, name of artist and year of award.

SALES.

Pictures accepted in Class A will be marked in the catalogue as for sale, at the option of the exhibitors, who will designate the price of each work – if for sale—in the proper column of the entry form. The price will include frame. Ten per cent. of sales will be retained by the Committee.

CATALOGUE.

A suitable catalogue will be prepared, to be sold during the exhibition, at 10 cents per copy. A limited number of souvenir copies of the catalogue, containing list of awards, and without advertisements, will be printed on extra paper and sold, by subscription only, at 50 cents per copy.

COMMUNICATIONS.

All communications concerning the exhibition should be addressed to the Exhibition Committee or to the Secretary-Treasurer, Camera Club of the C. Bi. C., 409 15th street, Washington, D. C.

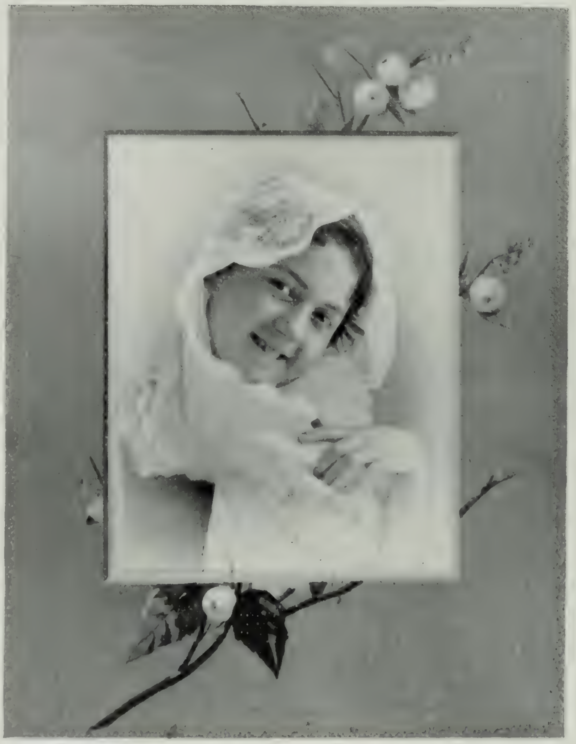
CHARLES RICHARDS DODGE, *Chairman*,
CHARLES H. SCHAAFF,
EUGENE LEE FERGUSON, *Sec.-Treas.*,
Exhibition Committee.

* * *

PROFESSOR WRIGHT in an interesting letter to us states that magnesium ribbon 0.17 mm. thick proves to be very transparent to the X rays. Comparative tests are in progress to ascertain the relative transparency of magnesium and aluminium.

A WRINKLE FOR AMATEURS.

THERE are many little dodges that the amateur photographer may avail himself of, which will yield pleasure and profit and afford an opportunity for the display of taste and skill. The making of mats and small frames for house decoration I hope to write on later. At present I will content myself with pointing out that double printing is capable of giving exquisite results, if sufficient attention and care be given to it. There is nothing new about the method, but it seems to me that its application has been but small compared with its possibilities. I have seen and used the celluloid negatives, with scroll and other designs, but these are all too stereotyped and common. In these days of posters, fancy book covers, almanacs and the like, it is an easy matter to acquire a set of negatives which will answer our purpose admirably and possess some originality. That part of the negative in which it is desired to print the second picture is stopped out and a print made. The second negative is now placed in the frame, the original print is screened from all action of light except just where the picture is desired, and printing is carried to the required depth. It will probably be found more advantageous to make the picture itself first and then to print in the border. This latter can, of course, be printed to any depth.



Another application of this method of double printing that may be used with advantage consists in photographing a frame suitably draped and then printing in the second picture. Indeed the applications are innumerable, and I have photographed a delicate wall paper and printed in a portrait with considerable success. I send the only picture of this kind that I have with me, but it will, I think, suffice. The outer frame was made from a book cover, and the prints look very pleasing. As I said before, there is nothing new in this, but old things are new to many of us.

John Heldmann.

"SURF PHOTOGRAPHY."

THERE is a fascination about the seashore that few can resist, and especially is this influence exerted upon the amateur photographer. His constant aim is change and variety; and upon the beach he will obtain this to his heart's content, for he will never find it twice just alike.

In the morning he may find a wide stretch of level sand, with only the ocean swell rippling along the edge; returning in an hour or so, he will see that the tide has turned, and that the firm, white sand over which he walked so securely a short time before is now covered by many feet of green sea water. Perhaps by evening, instead of the soft rippling, great breakers will be crashing along the beach, caused by a storm of a few hours' duration. In the course of a year or two, even the whole contour of the beach is changed by the ceaseless grinding of the surf.

It is pleasant to take a camera to the beach when the weather is fine and everything is calm and peaceful. But in the winter season, when storm follows storm in rapid succession, and the waters are lashed and harassed by the winds until at length they seem to find a relief in hurling themselves upon the shore, there is more of real, solemn grandeur to be seen in five minutes than in days when Nature is at rest.

Photo by James G. McCurdy.

No one can look upon such a scene without a desire to capture it and carry it away for future enjoyment, and there is nothing like the camera for doing this in a realistic, life-like manner. Indeed, there are but few artists who do not make use of photographs when painting views of surf.

It is true that to be successful there are many difficulties to be overcome and a great amount of patience to be exercised; but to my mind, one good view taken under trying circumstances gives more profit and real enjoyment than dozens made by the "pressing the button" method. The different conditions of wind and tide must be studied, and perhaps several visits must be made to the beach before a single exposure is made, and in most localities the beach is a weary way from home.

In surf photography, the larger the plate you have at your disposal the better, for if the plate is too small, it does not do the view justice, and fails to convey a correct impression of the subject. A plate that will allow ample space for a bit of foreground is a necessity, for a view of the surf taken "head on," unless helped out by a prominent background, which is not always to be had, is usually unsatisfactory. I always endeavor to get a bit of driftwood or seaweed for a foreground, but in case I am driven back by the water onto too high ground, I attempt to catch some point or bluff at the side, or a vessel in the offing, to break the monotony of the water.

In regard to rapidity of plates, I would say use the fastest to be had. Surf and sunshine are usually at outs; when you find one, the other is generally absent. If the negative is thin, a mercuric chloride bath will help it out wonderfully. Besides the poor quality of light, the rapidity with which the breakers make for the shore line would lead one to suppose old Neptune was getting so much apiece for every one landed. Focusing them upon the ground-glass is enough to make one's head swim, and is tantalizing in the extreme. One must work rapidly and confine himself to one particular view, or the bewilderment will prove fatal to good results. The surf has a mysterious manner of subsiding just as you are ready to make an exposure, and redoubles its efforts at another point, as though endeavoring to avoid being "shot." You pick up the camera and hurry to the new scene of action, only to have your former experience duplicated, and this could be kept up for a whole afternoon.

Photo by James G. McCurdy.

I have always been a disciple of the drop shutter and use it whenever possible, but have found that in surf photography it is far from being the best. The wind is sure to jamb the drop and render it immovable, unless it is rubber-banded to such an extent that it is untrustworthy. One afternoon I was on the beach and had a drop shutter along. It was blowing a gale, and the breakers were coming in thick and heavy. Down the shore a tug was steaming in, having in tow a large ship so close in that I could see the men aboard. "That will make a prize picture," I thought, as I arranged the drop, drew the slide and waited for the tug to take a good position on the plate. While thus waiting I hear a click, and upon investigation found that the wind had jarred the drop loose, exposing the plate before my subjects were ready. I was bitterly disappointed, but it was my last plate and I had nothing to do but pack up and go home. On developing the plate I found I had a good negative of the breakers, but the desired vessels "were not in it."

I almost always use an Anthony's single-view lens of medium focus for view work, and find that it does in most cases fully as good work as can be done with a higher priced instrument.

A pair of rubber boots never come amiss in beach work. They are very useful in climbing over slippery logs and wet sand, and often a view can be made that without their aid would never be attempted. On the beach you never know what minute you can expect to get wet feet. Often I have taken a position on the shore that I thought was beyond the reach of the water, only to be chased away unexpectedly by an impertinent hissing wave, while it has been no uncommon thing to have my lens covered with a film of spray, and my camera sticky with the contact of salt water.

The accompanying views were taken on lower Puget Sound and the Straits of Fuca, a region which, on account of its matchless and varied scenery, is a veritable artist's paradise. JAMES G. MCCURDY.

PORT TOWNSEND, Wash.

OUR ILLUSTRATIONS.

THE reproductions in this issue of the BULLETIN are of especial interest. Our frontispiece, we believe, is the best specimen of the possibilities of the X rays that has yet been published. The exposure has been made through the boot and trousers, and, while these are visible, the fine detail of the bones of the leg and foot is amply preserved. The nails in the boot-heel, the steel piece under the instep, the metal rings for the laces, the metal ends of the laces, the seam in the trousers and splashes of dirt are all clearly delineated, while at the same time the bones of the leg and foot are presented with marvelous distinctness. The negative from which this frontispiece is reproduced was made in the laboratory of Nikola Tesla. We would express our sincere thanks to Mr. Tesla for his kindly interest in our efforts, and for his permission to use this negative for reproduction.

The picture of the hand by Mr. Walter Griscom is reproduced from a photograph handed to us by Prof. Rood. It is exceedingly interesting, inasmuch as it shows a pin and a piece of glass through the bone. The print showing jewelry is also one of considerable importance. The large diamond in the brooch shows no evidence of having refracted the rays, for the pin is clearly visible beneath.

Mr. H. S. Curtis' pseudographs should be closely examined. They very much resemble many published X-ray (?) pictures, and teach a valuable lesson.

Prof. Rood's arrangement for obtaining precise information regarding the relative opacities of substances to the X rays we regard as highly important to all who are experimenting in this direction.

The full beauty of Mr. James G. McCurdy's surf photographs is hardly demonstrated in the half-tone reproductions, yet these latter suffice to show that seascapes are worthy of every attention. Mr. Macfarlane Anderson's pictures are exceedingly fine. The splendid atmospheric effect cannot be wholly reproduced in half-tone, but these most difficult subjects have been handled by him in his usual masterly manner.

By Stephen H. Horgan.

GRAIN SCREENS FOR HALF-TONE WORK.

THE use of an irregular grain screen instead of the present ruled one has long been desired by half-tone workers for special pictures. It must be conceded that a grain would be a better texture than dots or lines to reproduce in relief blocks photographs of old ruins, landscapes, animals, fabrics, and even some portraits. The results with a grain screen, however, will be uncertain to a degree, for the size of each dot of grain cannot be controlled with the precision that is the chief merit of the regular half-tone screen.

Grain screens have been made in this country by dusting a fine powder of asphalt on plate glass, as in the grain zinc etching process or in photogravure, only substituting plate glass for the zinc or copper plate. When the grains of asphalt were heated sufficiently to attach themselves to the plate glass, the latter was copied in the camera, giving a negative with irregular transparent dots, which was used as a half-tone screen.

The drawback to the use of irregular grain screens was found, not only in the accidental nature of the grain obtained, but in the fact that in the high lights, where the dots should be smallest, all the small dots disappeared, leaving only the largest dots widely separated, and, consequently, a disagreeable effect on printing.

Mr. E. Sanger Shepherd has laid before the Royal Photographic Society the result of his careful experiments in the production of

PHOTO BY MACFARLANE ANDERSON.

HALF-TONE BY SCHOOL OF PROCESS ENGRAVING.

ELK AND THE LAST SHELL.

irregular grain screens and in the securing of relief blocks therefrom. He has studied the subject more thoroughly than any one before him, and his conclusions cannot but be of interest. The best method of making an irregular grained screen is :

"By flowing an aqua-tint ground over a sheet of glass, etching in with hydrofluoric acid, then repolishing the glass to insure a perfectly clean surface, and filling in with printing ink, so that the screens are perfectly permanent. And in the event of injury by nitrate of silver or otherwise, the old filling can be washed out with benzole and refilled with fresh ink.

"There are three kinds of screens which may be used : (1) An etched screen, which is the most generally useful ; (2) a copy of an etched screen on a dry collodion plate, which I do not recommend, as it is liable to stains and a slight veiling of the whites ; (3) you may use a bitumen grain laid on the plate and heated, but this kind of screen is only useful for photo-lithographic work, because its effect is to produce very small dots, wide apart in the whites, and unless you roll up between the etchings, you cannot get sufficient depth. Another way of using the screen is to first expose a process dry plate under the screen to light for a short time, sufficient to give a dense image on development, and afterwards to expose it in the camera to the object to be photographed, and upon development you will get an image of the screen in dense black and varying density in between the dots, and from that negative you can print on chrome gelatine paper as in photo-lithography.

"Another method is to print from the ordinary negative on autotype tissue and then expose the tissue in contact with the screen. You will then have the ordinary autotype tissue print; but in addition to that, you will have a number of insoluble dots, formed through the apertures of the screen. If that print is mounted on a copper plate, developed and etched with perchloride of iron solutions of strength varying from 40 degrees to 30 degrees Baumé, you will get a typogravure plate.

(4) "The screens may be made in large sizes, and for poster work with a coarse grain you can get results very similar to those produced by drawing on a rough-grained stone. The screens can also be used in indirect color work. Instead of the bitumen ground dusted on the plate, I have used a print from a screen on copper in enamel ; you can etch for, say, periods of four minutes each, and with that particular screen and etching solution of the same density—perchloride of iron 35 degrees Baumé—you know you can always get the same result by etching for a given time.

"The screen is also useful in photogravure, for if you take a print from it in enamel, you can mount the autotype tissue upon it in just the same way as on a bitumen-grained plate. There is no fear then of the gelatine being pierced by the bitumen, and the autotype will adhere very strongly. It is also more easy to develop. I have found that the enamel will allow of etching quite as deeply as bitumen grain."

CROSSING OF LINES IN THREE-COLOR PRINTING.

When it became evident that the future of three-color work lay likely in printing from three half-tone blocks, and that the lines had best cross one another at angles of 60 degrees, it was found that the use of lines at that angle had been precluded by patents. It was hinted in these pages that such a patent could not be valid, for the reason that lines had long before been used at all possible angles in color printing by lithographers and others, and therefore could not be a new invention. Now Mr. W. D. Richmond tells in the *Process Photogram* how he used in color work lines crossing at an angle of 60 degrees thirty years ago, and published the reasons for doing so in the "Grammar of Lithography" in 1878. He says:

"The tints were at first crossed at right angles, and then across them again at an angle of 45 degrees ; but this was found to produce a disagreeable pattern, which was most objectionable when seen alone in a sky or other similar position in the picture. It was to obviate this defect that I hit upon the expedient of always crossing at an angle of 60 degrees. When two sets of line tints are crossed at a very small angle, a wavy effect is produced which is altogether absent when the angle is increased to 60 degrees, so that the latter angle answers equally as well as the angle of 90 degrees would for the half tints, while permitting the third transferring as well.

"Though the disposition of the lines at an angle of 60 degrees was a very important matter, it never occurred to me as being a patentable invention. Indeed, if the matter were inquired into I think it would be found that copper-plate engravers had done the same thing in their machine-ruled tints.

"It will be seen from the foregoing that the method of line crossing for tints now under review is at least thirty years old, but there is no evidence to show that it was made public at that time, though the mere use of it would be sufficient, we think, to upset any patent. Twenty years later, however, I described the method in the 'Grammar of Lithography," page 170, in these words:

"'The direction of this second series of lines is very important, and must make an angle of 60 degrees with those first transferred. A piece of cardboard may be cut into an equilateral (equal-sided) triangle of any convenient size, say 6 inches on each edge. One edge being applied to the lines already on the stone, a pencil line should be drawn along one of the other sides. The new transfer is cut along one of the lines, at or near the edge, or is marked similarly on the back, and is then laid upon the stone so that the lines will run in the direction previously marked, that is, forming an angle of 60 degrees with those first transferred. After transferring, the stone is to be prepared a second time, and a line put upon it to complete the triangle. The third transferring is then done, and the result should be that the lines coincide in direction with the three sides of the triangle, thus △.' Then follows the reason for so putting them.

"This portion of the 'Grammar of Lithography' was first published in 1877, in the *Printing Times and Lithographer*, which circulated all over the world. The 'Grammar of Lithography' was published separately in 1878. It was republished in America, in 1883, by Palmer and Ray, in the *Pacific Printer*.

"I think it is quite likely any persons may independently invent so simple a matter. I feel quite charitably towards such people, because I have reinvented more than one thing myself, and in one instance afterwards found that I had possibly read of the matter in a book I had long possessed."

ANDERSON'S GUIDE TO COLOR WORK.

The long-looked-for work by Macfarlane Anderson on process work has at last appeared. It is entitled, "Anderson's Photo-Mechanical Processes and Guide to Color Work," and published by E. & H. T. Anthony & Co. A good idea of the comprehensiveness of the book may be gained from the following list of subjects, each of which is treated in a separate chapter: 1. The Negative Bath. 2. The Studio. 3. Photo-Lithography. 4. Collotype. 5. Photogravure. 6. Zinc Line Etching. 7. Half-Tone Negative. 8. Full-Tone or High-Light Process. 9. Single-Line Negative from Cross-Line Screens. 10. Intensification and Reduction of the Half-Tone Negative. 11. Bitumen Half-Tone Process. 12. Enamel Half-Tone Process. 13. Proving and Blocking. 14. Color Screens for Photochromic Work. 15. Anderson's Revolving Multangular Grating. 16. Photochromic Transfers for Litho Printing. 17. Half-Tone Printing. 18. Electrotype Moulding. 19. Cold Process of Stereotyping. 20. Apparatus.

Mr. Anderson gives in these pages not only the knowledge gained by his personal labors, extending back many years, but he has collated and includes the experiences of the most reliable authorities in each branch of process work. The authorities quoted contradict one another at times, or at least do not agree, but that is a way doctors have. The first principles of color work, which is still an enigma to most of us, are told here in the light of present knowledge. This book is bound to attract attention among process-workers the world over.

COMPARATIVE STRENGTH OF VARIOUS LIGHTS.

Dr. Eder has made comparative tests of the strength of various lights with the following results, a gas flame being taken as a unit :

Gas flame	1
Oxy-hydrogen light	11
Magnesium ribbon	58
Diffused daylight	268
Electric light	5,179
Sunlight	16,079

PROCESS NOTES.

It is now said of the small pits or holes in copper plates that appear on etching, and commonly called "devils," that they are caused by impurities in the copper, chiefly iron.

Count Vittorio Turati, of Milan, announces a new process dry plate which, he says, has nothing in common with present dry plates. The exhibits he sends are quite promising.

The half-tone blocks used in the *Illustrated American* are made from process dry plates.

Process Work, that valuable little London monthly, is to be enlarged to twenty-four pages, and its title changed to *Process Work and the Printer*. In the hands of its present editor and publishers it cannot be otherwise than successful.

Prof. Herkomer's much-heralded invention which was going to take the place of photogravure is now said to be an old process patented in 1841 by a Mr. Palmer ; and, further, it appears that in the London Exhibition of 1851 a medal was awarded for an identical process to a man named Auer.

THREE-COLOR PROCESS PROGRESS.

Husnik and Hausler are now supplying blocks for three-color printing at 4 shillings per square inch per set. In this country the same can be had at $1 per square inch per set.

The Photochrome Company, of Zurich, have organized a company in Detroit, Mich., with a capital of $300,000 to carry on the business of printing and publishing three-color work.

The Compagnie Française de l'Heliochromie has been organized in France with a capital of 125,000 francs to exploit color photography.

Mr. B. J. Edwards is the last to invent a camera for making simultaneously the three negatives for photo-chromy. With the cameras for the same purpose devised by Nachet, of Paris ; Ives, of Philadelphia, and Gray, of New York, they promise to be in common use in time.

PROCESS VERSUS WOOD ENGRAVING.

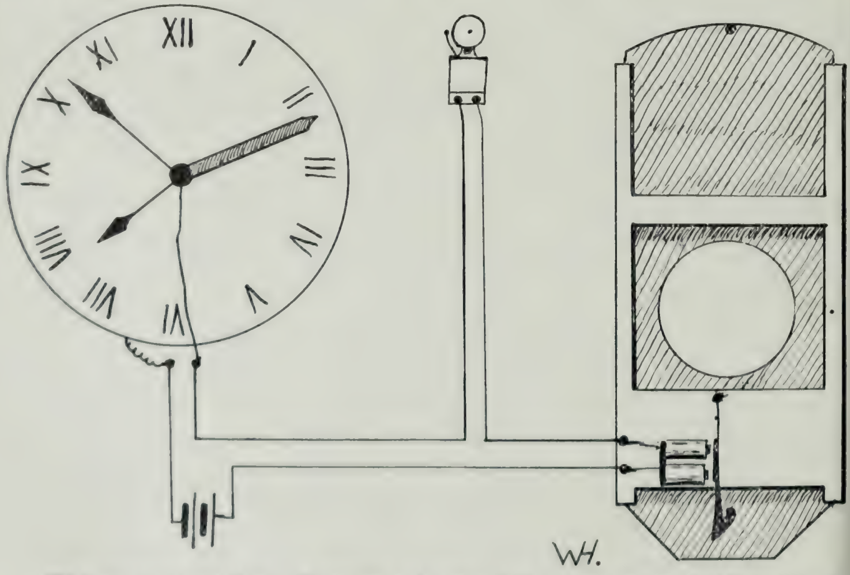
The art reviewer of the London *Daily Chronicle* expresses the following advanced views regarding the merit of process over hand-engraving. In reviewing a book of wood engravings by Timothy Cole he writes:

> "He seems to us, in many parts of the engraving, to forget that he is engraving a picture by Flinck, and to think only about the engraved line of Timothy Cole, in fact, to be falling into just the same trap which ruined W. J. Linton—the assertion in line of his own individuality, and not the complete subjection of it. What made the success of process, what has maintained it, and probably will continue to maintain it, is not its cheapness, not the quickness with which a block could be produced, but the fact that no lines, no dots or tones made by an engraver, were visible in it. * * * If Mr. Cole were engraving a design of his own, it would be his duty to put as much of himself into it as he could. But if he is engraving some one else's work, the minute we become conscious of his presence we turn with greater pleasure to a process block."

It is not fashionable just yet for art critics to notice process-work favorably, but they will come around to this reviewer's opinion in time.

A CLOCK THAT CAPS THE LENS AUTOMATICALLY.

THE half-tone photographer will, in a week, waste several hours while waiting to cap his lens at the end of the proper exposure. Mr. S. H. Horgan, in a recent number of the BULLETIN, asks for a suggestion of some means whereby the lens may be capped automatically and a bell rung at the same time.



The accompanying diagram shows the arrangement of a very simple and effective means of accomplishing this purpose. Through the center of the glass, over the face of the clock, drill a small hole and arrange a thin piece of wood or ebonite as long as the minute hand on the inside, so that it can be turned from the outside when the glass is closed, just as the movable index of an aneroid barometer. Along this pointer run a small covered copper wire and bend the end, which should be hammered out thin, so that when the pointer is over the minute hand the wire touches it; pass the other end of the wire out through the hole in the glass. Solder another wire to any part of the metal frame of the clock, and the time-piece is ready. To complete the arrangement it will be necessary to buy only an electric bell outfit and a small electro-magnet. The drop shutter shown needs very little explanation; it can be made of cigar-box wood with a slide made of thin brass. Just below the opening for the lens place the magnet, as shown, with its armature fastened to the spring, ending in a catch, which holds the slide up during the exposure. Make the bell and battery connections as shown, and you are ready to economize your time. Put your plate-holder in place, draw the slide, push the shutter up till it catches, set the clock pointer as many minutes ahead of the minute hand as you wish the exposure to last, and go about your other business—the bell will tell you when your plate is "cooked."

W. C. HARRIS.

PHOTO-LITHO TRANSFERS.

REFERRING to the article in our February issue on the probable source of the difficulties sometimes experienced in making lithographic transfers, Mr. Macfarlane Anderson writes us a letter in which he gives us his experience in this connection, and cites an incident that occurred in 1882. He says: "It was in the autumn of the year, the daily temperature at this season being very variable in England. I state this, subsequent details proving what bearing temperature had upon the subject. A younger brother of mine was doing the practical work of the photo-litho transfer department, and had given me every satisfaction with the work coming from his hands. In the transferring room were some thirty presses, fully half of them being in constant use in photo-litho transfer work.

"When a batch of transfers which had been prepared the previous evening was sent down to the press-room foreman in the morning, they were distributed by him to some three different transferrers, and, as Mr. Horgan says, 'some would complain, while others had no trouble.' Of course, the complaints came to us in the shape of a handful of spoilt transfers, brought by the rushing, hurrying press-room foreman. Such happenings, commencing as somewhat irregular, became regular in their appearance, when the fact became known that a certain transferrer always had a hand in the work.

"To be continually re-making transfers over again, and some dozens at that, every few days, is bound to affect the complacency of any one's nature, the more so when it is seen that the spoliation had become chronic.

"Batches of spoiled transfers continued to appear with awful regularity, and, with a determination most beautiful, were made and re-made over again. Meanwhile, in a quiet corner of our private workroom, I had a small hand-press installed. Often after the daily toil were my nights spent with the gas in endeavoring to secure a knowledge of the mysteries attending the transferring, gumming, etching and proving on the litho stone."

The result was that it was fully determined that by leaving the litho stone long enough in the heating chamber to draw and absorb the ink clean from each and every surface, the trouble could be obviated.

ON A NEW METHOD OF PREPARING PLATES SENSITIVE TO THE ULTRA-VIOLET RAYS.

BY V. SCHUMANN.

Translated from the *Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften, Math.-Naturwiss. Classe. Band CII, Heft VIII, Wien*, October, 1893, pp. 994–1024.

COMMUNICATED BY COL. J. WATERHOUSE, I. S. C.

IT frequently happens that for various experimental purposes plates with a sensitive surface of pure silver bromide, or bromo-iodide, are required, and are not always easy to prepare. Some few years ago, Herr V. Schumann reported that he had found a means of preparing plates sensitive to the ultra-violet rays in regions hitherto quite unrecorded by photography. The full details of Herr Schumann's method of preparing these plates have now appeared in the Transactions of the Vienna Academy of Sciences, and present so many points of interest and show such thorough working out by Herr Schumann that a translation of the paper seemed desirable. It was intended originally to be merely an abstract for my own use, but it was found very difficult to condense it without loss. The paper forms the sequel of two papers on the "Photography of the Rays of Shortest Wave-Length," published in the same volume of the *Sitzungsberichte* (pages 415–475 and 625–694), which deal with the instruments and the necessary optical and electrical arrangements for taking these photographs of the region of the spectrum between w. l. 231.35 and 100.0 $\mu\mu$, and the many difficulties to be surmounted in doing so, especially in the case of the wave-lengths between 182 $\mu\mu$ and 100 $\mu\mu$, for which entirely special arrangements had to be adopted.—J. W.

INTRODUCTION.

In my previous papers (noted above) I have followed out the spectrum of electric discharges far beyond the hitherto known limits of the ultra-violet (185.2 $\mu\mu$), up to the neighborhood of wave-length 100 $\mu\mu$. The observations were carried out by photographic methods, as far as w. l. 182 $\mu\mu$, with gelatino-bromide plates, and thence to w. l. 100 $\mu\mu$, with a plate which I prepared specially for this purpose by a new method.

The rays beyond w. l. 182 $\mu\mu$ have remained quite inactive by any method of spectroscopic observation hitherto employed. They are only perceptible with the above-mentioned plates, with lenses and prisms of fluor spar, and with the spectroscopic apparatus in a vacuum.

The method of preparation of these plates is the result of a research not yet finished, which I only noticed briefly in the first part of the papers mentioned. It yields a coating for the plates of the desired fineness and sensitiveness, films which are more sensitive for the new rays than for the remaining part of the spectrum, and which, on this account, as I shall show later on, fulfill their purpose in two ways.

The plates are less satisfactory in other respects; they suffer in time from large and small defects in the surface, which can only be checked by proper exposure and by skillful application of definite precautionary measures for the development of the image. But as soon as this precaution is put aside numberless spots appear of different intensity and size which overrun the image and destroy its otherwise so remarkable sharpness. This is the direction in which my process requires improvement, and is, at the same time, the principal reason why I have not published it earlier. I certainly hope still to be able to overcome this defect, as a result of further researches, if more time is available to me for them, as my earlier observations lead me to believe.

Under such circumstances, it might have happened that the free publication of my process, which I had not intended until this improvement had been made, would have been indefinitely postponed, but this would not have agreed with the final object of my investigations, which was to make the spectroscopy of the new region of rays accessible as soon as possible.

The following circumstances have also influenced me :—

The above-mentioned account of my researches on the shortest wave-lengths has since its appearance met with such a friendly reception, that a more active interest in the investigation of the new region of rays seems to have already been secured. This is shown especially by the efforts that are being directed to the problem of extending our knowledge of the molecular theory by means of the spectrum. It may be remarked thereon, that the earlier researches in this direction, which first of all only aimed at the discovery of a regular connection between the lines of an element and between the spectra of different elements have, up to the present time, given the most favorable results the nearer they have approached the hitherto known boundaries of the ultra-violet region. The shorter the wave-lengths of the region under observation were, so much the more markedly this regularity was disclosed. From this it may be expected that the new region of rays, with its incomparably shorter wave-lengths, will yield rich material for observation towards the completion, as well as for the verification of the results hitherto obtained; and so much the more that the investigation of a whole series of elements, which has hitherto been quite without result in the direction mentioned, is directed on this part of the spectrum alone. For observations of this kind the new plates, even before their improvement, should be a welcome help. It is this especially which has, in the first place, decided me to abandon my original intention and publish my process at once.

(*To be continued.*)

SOCIETIES

Photographers' Association of Ohio.—"The sixth annual convention of the Photographers' Association of Ohio will be held at the City Hall, Columbus, July 14, 15, and 16, 1896. By a unanimous vote, the Executive Committee decided to give medals for prizes instead of donated articles, as has been the custom heretofore. Recognizing the fact that the interest in the Association and its attendance is not confined to the State, they added to the prize list a special class open to all photographers outside of Ohio. The Salon Committee, enthused by the success of their initial venture, and fully aware of its shortcomings, are preparing for the finest exhibition of pictorial photography that has ever been given in this country. Ohio has, within her borders, more of the 'leading lights' than any other State in the Union. Her ability to conduct conventions has been well proven. She has lost none of her prestige. The coming 'meet' will firmly establish her claim as leader in all things photographic. An artistic souvenir containing several pages of chemigraph reproductions of Salon pictures, names of all members in good standing, prize list and much other useful information, will shortly be issued. A copy will be sent to every member of the Association. To others on application."—George B. Sperry, *Secretary*.

* * *

We would call the attention of our readers to the Washington Salon and Art Photographic Exhibition, to be held in the Assembly Hall of the Cosmos Club, Washington, from May 26th to May 29th, inclusive. The importance of this movement is obvious, and it should receive the hearty support and the earnest consideration of every photographer in the country. At last there promises to be what may be truly termed an art exhibition undertaken solely in the interest of photography and having for its object the encouragement "of all honest workers who possess artistic feeling and who are striving to produce, by photographic means, pictures in the best sense of the word."

* * *

The third international exhibition of the Photo Club of Paris will be held from May 12th to May 31st. Application should be made to M. le Secrétaire Général du Photo Club, 40 Rue des Mathurins, Paris, and April 25th is the last day on which pictures will be received.

BOOKS RECEIVED.

"Instantaneous Photography," by Captain Abney, published in America by E. & H. T. Anthony & Co. This is a thoroughly practical primer dealing with the lenses, shutters and plates for use in instantaneous work, and giving valuable pointers on development, intensification, and on the choice of subject.

* * *

"La Photographie Moderne," by M. Albert Londe, a practical treatise on photography and its applications. This is the second edition of a most complete text-book, and is characterized by thoroughness and careful compilation. It is a book we can highly recommend to all acquainted with the French language. Published by G. Masson, 120 Boulevard Saint Germain, Paris.

PHOTOCHROM

Our Colors

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ANTHONY'S
Photographic Bulletin.

EDITORS:
PROF. CHARLES F. CHANDLER, PH.D., LL.D.
FREDERICK J. HARRISON.

VOL. XXVII. MAY, 1896. NO. 5.

TO SUBSCRIBERS.

THE very decided increase in circulation that has accompanied our efforts to make the BULLETIN a thoroughly practical and up-to-date magazine for the photographer and process worker has encouraged us to more ambitious efforts, and, with this issue, we take up the illustrative arts generally, hoping to so balance photography and photo-reproduction that all may be satisfied.

The space originally devoted to photography will be retained, and arrangements have been made for bright, well-illustrated matter that will be of value to both amateur and professional. In addition, the photographer will have the advantage of the extra illustrations, and will certainly become interested in the methods used in their production.

The process worker will find his particular subject treated fairly and in detail. The best known writers will contribute reliable matter, and illustrations will be used wherever benefit will accrue. The engraver, at the same time, will have an opportunity to dip more deeply into photography than has been his habit in the past, and information on a topic so closely allied to his practice cannot fail to prove beneficial.

We invite the hearty co-operation of our readers, stand ready to answer, to the best of our ability, all inquiries on any subject, and especially solicit matter bearing on the illustrative arts that will be of use to our readers in general. We desire to make our journal a medium for exchange of ideas on all subjects connected with illustration by the aid of photography, and will render all assistance possible to those looking for advice.

This issue of the BULLETIN may be taken as a fair sample of what subsequent numbers will be. If not a subscriber, become one; if a subscriber, show this copy to an interested friend.

SINGLE SLANT SKYLIGHTS.

THE best form of skylight? is a question that occasionally presents itself to photographers, and inquiries we have recently been making indicate that side and top skylights are rapidly being supplanted by what is known as the single slant light. When the necessity for shading, screening, and the employment of many complex devices for obtaining satisfactory lightings with the top and side light are considered, it is not surprising that a change is considered desirable. A canvass of some dozen prominent photographers, some of whom are using the top and side light, brings out the fact that the latter is unsatisfactory, for other reasons than the necessity of complex arrangements for curtaining. In some cases glass of various colors has been used, but in no single instance have we found a photographer perfectly satisfied with the old form of skylight. The few who have adopted the single slant light express themselves as being perfectly satisfied with it. A multiplicity of curtain strings and guides no longer bothers them, and, indeed, in many cases curtains have been dispensed with. All that is used is the glass light, a head-screen and a reflector.

The form of light that apparently gives the greatest satisfaction, and with which we have seen the very best quality of work produced, is constructed as follows: The glass used is known as hammered ground glass, ground on the hammered side, the cost being about 15 cents per square foot. It is started about 3 feet from the floor, and comes into the studio 5 feet at the top; the light is about 20 feet high and about 14 feet wide. This can be considered an improvement on Eggenweiler's skylight, which our readers will remember is a vertical light, and it has all the advantages of this latter, seeing that leakage, lodging of dirt, inaccessibility, and other troubles inherent to the old skylight, are dispensed with.

We understand that a single slant skylight will be built at Chautauqua for the purpose of demonstrating its efficiency during the coming convention.

RÖNTGEN'S X-RAY PHOTOGRAPHY.

MR. JOHN MACINTYRE, of Glasgow, writes that in his opinion the best way of preparing a good screen for use with the Crookes tube is as follows: "A quantity of barium platinocyanide is rubbed in a mortar until a fine powder is formed, and is then mixed with a solution of mucilage until a thin, yellowish fluid, capable of being poured upon the glass, is obtained. This is allowed to dry slowly, and gives satisfactory results." He says further, that black paper or thin black cardboard placed behind the barium platinocyanide screen is not as good as a piece of aluminium; that the best results are obtained in a darkened room, and that the fluoroscope itself should be made of such material as to exclude the possibility of ordinary light getting through. The nearer the object is to the screen, the better is the result; and when thick structures are under examination, the further the object is removed from the sensitized surface, the further back must the Crookes tube be removed.

We have seen it stated in some journals that efforts to photograph through the viscera have in no case been successful. We have recently assisted at experiments designed to discover whether a patient was or was not suffering from stone in the kidney, and successful photographs were made right through the abdomen, showing with remarkable distinctness the buttons and buckle on the back of the trousers, the hip bones, and lower ribs.

* * *

The objection that prolonged exposures are necessary for X-ray pictures bids fair to be entirely removed. Mr. John Carbutt has sent us a magnificent photograph of the hand and wrist made on his X-ray plates, with an exposure of one minute, by Prof. Goodspeed; but the most remarkable result was a picture of the bones of the forearm, with an exposure of seven seconds. The result was as perfect as could be desired.

* * *

Now that photographers in their experiments on this interesting subject are using electric batteries, it may interest them to know that the trouble experienced by evaporation of the water in the batteries can be greatly retarded, if not completely avoided, by pouring paraffin oil over the solution in each cell. This excludes all the air from the liquid, and prevents evaporation.

* * *

We have been deluged with inquiries regarding the cost of apparatus for producing X-ray pictures, and would refer our readers to our advertising columns, where full details are given. We would repeat our warning regarding Crookes tubes, advising intending purchasers to buy their tubes from reliable houses only; which houses will certainly test every tube before it is sent out.

* * *

Much is being made of the fluoroscope, and we have heard it said that photography will be relegated to second place in connection with X-ray work. We cannot believe this, as photography is at present the only means of obtaining a permanent record of results. With Dr. Bleyer, we have been working on what might be called a photo-fluoroscope, in which the ordinary fluoroscope is made to serve practically as a plate-holder. The fluoroscope, as described in our April Bulletin, is a conical-shaped box, with eye aperture at one end, while the base of the cone is formed of a screen coated with calcium tungstate or barium platinocyanide. One side of the fluoroscope, near this screen, is fitted with a hinged door, through which a plate-holder can be passed. A satisfactory position having been obtained by ocular examination, the whole apparatus is fixed in position, plate-holder inserted, slide withdrawn and exposure made. In this way that part of the tube richest in X rays can be readily ascertained, and the exposure we have found to be greatly diminished.

Mr. A. C. Swinton writes: "Another peculiar effect of these X rays has been investigated by Prof. J. J. Thomson, and consists in the facility with which they discharge an insulated body charged with either positive or negative electricity. In fact, any substance, however good an insulator it may be under ordinary circumstances, seems to become a conductor of electricity during the time that the Röntgen rays are passing through it."

* * *

"We have examined a number of X-ray photographs of the human foot, both male and female, and have noticed with amusement, and some satisfaction, be it added, that the pictures make excellent object lessons with regard to the very common vanity of wearing prettily shaped boots and shoes at the expense of comfort and to the detriment of the natural foot. Nature has ordained that the broadest part of the foot should be where the big toes extend, but the shoemaker knows better, and has taught people to compress this part to the smallest compass; hence the toe nails are forced inward, and the beautiful anatomy of the member altogether destroyed. The Röntgen photographs show the deformity to perfection, and presently, we hope, will afford similar object lessons regarding the suicidal effects of tight lacing. We laugh at the Chinese custom of dwarfing the foot, and throw plenty of stones, forgetting that we ourselves live in a habitation of glass.—*Amateur Photographer* (*Eng.*).

* * *

The pseudo X-ray pictures, made by Mr. H. S. Curtis, and reproduced in our previous issues, should teach a lesson regarding the care of plate-holders. These pictures showed that, with an exposure of about one hour, remarkably good shadow pictures could be made through ebonite, black paper, and even red press-board. Exposures of some few minutes to the direct sun gave some sign of image. It behooves workers in the field to carefully protect their plate-holders from light. With the hand cameras now in general use, this is not a very difficult matter, as there is usually accommodation at the back of the camera for all the holders carried. But when changing the plate-holder it is well to seek a shady place, or to stand so that the sun is at the back and is shielded from the holder by the body.

* * *

We yet have on hand a few copies of the March and April issues of the Bulletin. The March issue ran to a second edition, and contains Röntgen's original paper, the remarks of Eder, Liesegang and Swinton, and an account of the work of Rood, Wright and other American scientists. The April Bulletin has, as frontispiece, a life-size reproduction of a foot, made through the boot, showing trousers, boot, flesh and bones, with wonderful distinctness. Prof. Rood's remarkable work on the reflection of the X rays appears in this issue.

These two numbers of the Bulletin contain more accurate information on the new photography than can be obtained elsewhere.

Items of Interest

ALL photographers should bear in mind that the Convention of the Photographers' Association of America will be held at Chautauqua June 22d to 27th inclusive, and a special effort has been made this year to make this Convention as instructive as possible. Demonstrations in every branch of the art will be given by competent workers, and all who go will have ample opportunity to become acquainted with the latest advances in photography.

* * *

A FEW maxims for those who are seeking positions by replying to advertisements are given by the *British Journal of Photography*.

1. Write legibly and to the point; answer all queries of the advertisement.

2. Enclose a stamped addressed envelope for a reply.

3. If enclosing a "portrait of self," let the sender's name be legibly written upon it.

4. In sending specimens, let stamps for return invariably accompany them, with also a suitably addressed cover for their return.

5. Let every specimen have its owner's name (and preferably address), written plainly on some part of the picture or mount. If on the picture itself, there is little danger of dishonest persons retaining them.

6. Let every parcel be neatly packed and securely tied, and let nothing, "of the nature of a letter" be enclosed in a packet sent at package postal rates.

* * *

THE latest thing to be perfected is the exhibition of kinetoscope pictures on the screen. We have recently assisted at a private exhibition at which results were obtained that were truly wonderful. The eideloscope, as the particular instrument that we saw is called, is the invention of Mr. Latham, and is an evidence of great ingenuity. The band of film carrying the positive image passes rapidly through the electric projecting lantern, and the image on the screen shows, without tremor or vibration of any kind, everything that has hitherto only been seen in the kinetoscope. In fact, so startling were the effects, that we moved to one side when a regiment of soldiers was shown marching down the street. The highly perfected state to which Mr. Latham has brought his instrument will astonish even those who have closely followed the wonderful effects obtained with the kinetoscope. We understand that it will soon be on exhibition in our largest cities, and we would advise our readers to avail themselves of the opportunity to see this latest wonder. With the perfect phonograph and the eidoloscope one may leave his gestures and voice to posterity.

* * *

When sending your exhibit to the Secretary of the Photographers' Association of America, care should be taken to place a label inside the lid of the box, with address plainly marked thereon. Screws should be used instead of nails, so as to prevent the lids being smashed.

* * *

As if in illustration of the article on the danger in using flash-light compounds without a full understanding of them, which we published in a recent issue, we are in receipt of the fragments of a well-known hand flash lamp and a letter from its former owner, lamenting the loss of the use of a hand. Upon inquiring as to the nature of the powder used by him, we find that he is "not sure of the exact name, but it was something like ——," naming a powder designed for the large machines, in which the powder is dropped into the flame from a cup. We would repeat the oft-told warning: Use nothing but pure magnesium powder in hand flash lamps.

"HOME PHOTOGRAPHY."
By J. J. Williamson.

* * *

Retouching is an art seldom successfully practiced by the amateur photographer. It is not an easy thing to acquire, and while in most cases the negatives made by professionals are so smoothened out as to be almost spoiled, retouching in some degree is essential to subdue or remove blemishes which are accentuated by the camera. A device recently brought out by Mr. J. C. Strauss, of St. Louis, and known as the Strauss stipple plate, obviates in a large measure the necessity for retouching. This stipple plate is a thin crystal glass plate, free from blemish, having on one surface a delicate, almost indistinguishable, stipple effect. The stipple plate is placed in the plate-holder in front of and in contact with the sensitive plate. The exposure is thus made through the stipple, and all hard blemishes are softened. The time of exposure is not increased, and the result is a negative yielding prints of a softness and delicacy that is surprising. The stipple effect is only visible on very close examination.

* * *

TRY backing your plates, and thus dispense with halation. The part played by halation is not understood by professional photographers. Whenever white draperies are to be photographed, backed plates should be used. To be convinced of the fact that the backing does play an important part, coat one-half of a plate with an anti-halation backing, and then expose the plate. The difference in the two halves of the plates will be very apparent.

* * *

MR. LOUIS A. LEMKE, formerly printer for our publishers and for the American Aristotype Company, has opened a large establishment at Fulton, Ill., where he will undertake printing and retouching for professional and amateur photographers.

* * *

PICTURE plays have an interest far exceeding the usual lantern-slide exhibition. The latest is the production of Mr. James Howard Bridge, and is titled, "Cupid in California." A capital plot is skillfully unraveled by the author, and wonderfully illustrated on the screen. The various characters were undertaken by actors and actresses, who entered fully into the spirit of the thing. The result is a unique selection of slides wonderfully perfect. The photographic work was in the hands of Mr. E. R. Rockwood, who may well be satisfied with the results. The new picture play should be successful.

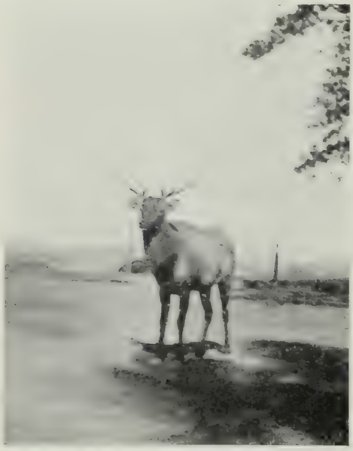
* * *

THE Photographic Blue Book for 1896, now being compiled by the editor, Mr. Walter Sprange, at Beach Bluff, Mass., judging by his promises in a circular received recently, and also by the manner in which he has more than fulfilled them in his former works, will be an extremely valuable addition to the photographic library. It is to contain much original matter in the way of information of photographic exhibitions, competitions and contests, and also for the camerist abroad, who is in search of interesting subjects for exposure. It is to embrace manufacturers, as well as "darkrooms" and dealers and professional photographers, in its lists, and to present a list of publications, with occasional photographic articles, and also of magazines, with illustrations, which are reproduced from photographs.

* * *

All copy for the June issue must reach us on or before May 23d.

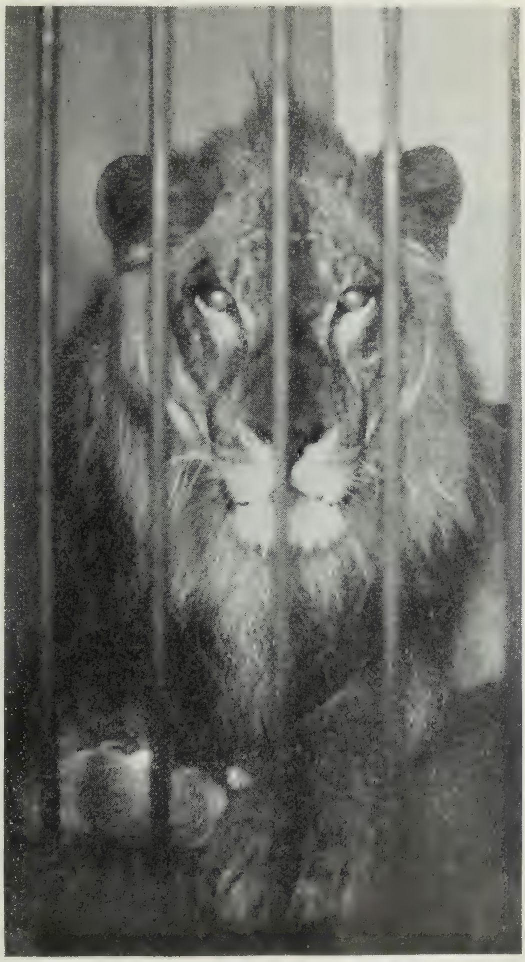
PHOTOGRAPHING WILD ANIMALS.



WHEN an amateur, or a professional for that matter, starts out to "take" wild animals, he needs a good stock of patience in addition to a first-class photographic outfit, even though the animals he proposes to photograph are in a state of captivity, and not quite as wild as when they roam the woods. I was reminded of this over and over again when I made my first attempt to photograph an elk bull at Belle Isle Park, Detroit. When I put in an appearance within the enclosure in which he was kept, together with a number of elk cows which constituted his harem, the monarch of the glen evinced a desire to get well acquainted with me and my camera, a disposition that I was by no means disposed to encourage. Now and then he lowered his formidable horns in a threatening manner, and I believe that if the game-keeper had not been present a certain amateur photographer would have taken to flight with an elk in hot pursuit.

It would weary the indulgent reader to recount the many ineffectual attempts that were made to get the big beast into a proper position to have his photo taken. He acted as though he had never seen a camera before. Evidently he had not the slightest conception of the etiquette of the studio, and could not discern a camera from a gun. He was as coquettish as a society belle, and changed his position every moment. Finally I got him into the right pose, and snapped the shutter. Now, thought I, I've got you, old fellow; now you may cut up as much as you please and indulge in as many antics as you like. Alas for the fond dreams of the amateur! Having used a detective camera and trusted to luck, more or less, I found that my picture was out of focus. *Nolens volens* I had to go again and have another interview with his elkship, which, however, terminated to my entire satisfaction, for I got the majestic brute into a splendid pose and secured a good negative.

My attempt to photograph some bear cubs in the same park was ludicrous, and much enjoyed by all present, except myself. "Got any candy with you?" was the laconic inquiry with which the keeper of the interesting pets saluted me. When I answered in the negative, I was told that it would be exceedingly difficult to keep the young Bruins quiet long enough to secure a good photograph of them. The surmise proved to be entirely correct, for no sooner were the cubs liberated (I had made up my mind to take them out of doors) than one began to climb a tree, while the other made straightway for me and my apparatus, and essayed to embrace us both. I warded off his amiable intentions with the end of my tripod, and finally induced him to desist. When he found no fun was to be got out of me, he cavorted all around the place, followed by the irate keeper, until he was recaptured and returned to his den. Meanwhile Cub No. 1 was amusing himself in the top branches of a tree, 50 feet in height, and I was sighing in vain for a tele-photo lens.



I paid my bear cubs a second visit, with better success. This time I was provided with confections, and while they were busy tasting the sweetmeats I took a good "shot" at them. The illustration that accompanies this article shows how importunate they were to get at the candy. In one of the pictures made, the larger of the two was pushing his mate away with one paw, while the other rests on the laughing gamekeeper, begging silently for more taffy. The other cub had evidently been sitting down man-fashion. In the illustration here reproduced the largest cub is seen taking candy from the extended hand of the keeper, while the other young Bruin was out of sight, executing a *pas seul* over the snow.

In taking the picture of the lion which figures in these pages I made use of a tripod camera, and had recourse to a very rapid plate and flashlight. After focusing carefully on the lion's head, which was close to the bars, I set off the flashlight. After the lights were turned up again the lion was found in the same position ; the king of the animal kingdom had not been frightened. The lion, "Prince," is six years of age, and the pride of J. H. Moore's Detroit menagerie. He is a magnificent animal, but ferocious to the last degree. While I was getting ready to take his photograph, he watched every move I made, regarding me intently out of the corner of his eye. Even in a position of repose the lion is a majestic animal, every inch a king.

I tried several times to photograph Prince by the aid of daylight, making a time exposure with a very rapid plate, but the result was unsatisfactory, for the place in which he was confined was poorly lighted. A photograph of a leopard, which was taken under the same circumstances, turned out just as poorly. Moreover, I had to wait fully half an hour before the spotted beast quieted down sufficiently so that I could make an attempt to photograph it. Felines have a disagreeable habit of walking a cage restlessly, and it is only when they are skulking in the rear of their place of confinement that they may be photographed with success. In a general way, it may be said that the best place to photograph these beasts is a zoological garden, where the cages are roomy and not infrequently constructed in the open air, and that summer is the best time to do the work. Large cages enable one to step close up to the bars, and to take a snap shot at the pacing beast before it is aware of one's presence.

The great difficulty in photographing wild animals, especially those that are at liberty, is to get near enough to them to secure a good picture, and this is a difficulty that is obviated by the use of a tele-photo lens. On more than one occasion, while I was preparing the illustrations for this article, a tele-photo lens would have been of the greatest usefulness to me, and I would advise every one who proposes to photograph wild animals, especially in their habitat, to provide himself with one. Ordinarily, a good rapid rectilinear lens will do. A detective camera is preferable to a tripod instrument, for obvious reasons, but occasionally the latter will be of use.

The pose of the animal to be photographed is of importance; it should be natural. If it is in any way constrained, the resulting picture will not be a success. It will take patience to get the animal in a good position, or to wait until it assumes a suitable pose, but, as I said at the outset, if the photographer does not possess this necessary qualification for the work, he will not succeed in it.

Mr. and Mrs. A. G. Wallihan, of Lay, Colo., have made a great reputation in this department of the art-science by photographing the wild animals of the West in their natural abodes. I do not know how they secure such uniformly good results, but should not be surprised to hear that they use a tele-photo lens. A Pittsburgh amateur, whose name I have forgotten, managed to get a number of good photographs of wild beasts in an ingenious manner. He connected apparatus with his camera which, when stepped upon by an animal at night, set off flashlight and snapped the shutter at the same time. This clever contrivance was set up in the woods at nightfall, like a trap, and not infrequently the image of a wild animal was on the sensitive plate in the morning. Photographs secured by means of this apparatus in the swamps of Africa, the jungles of India, or the primeval forests of

South America, would be of great value to zoölogists, and of interest to photographers everywhere. Hereafter the outfit of explorers will not be complete without one of these inventions.

Not many years ago a gun camera was placed on the market, but, for some reason or other, it does not seem to have met with popular favor. It was attached to a gun, and the plate was exposed whenever a shot was fired. I have never heard of anybody who made use of one of these cameras, have had no experience with one myself, and therefore cannot say if it is practicable or not. Recently E. Decker & Sons, of Cassopolis, Mich., have placed a camera on the market which they term the gun camera, but which is not attached to a gun, although being fastened to a stock like that of a rifle.

The photographs of the deer are by Mr. L. F. Eaton, of Detroit, and the remaining illustrations by the author. Dr. Hugo Erichsen.

THE NEW SHADOW PHOTOGRAPHY.*

THE subject of this lecture, or this demonstration, as I would rather call it, is very difficult to name, for the reason that as soon as you begin to name it you quarrel with somebody. One name that has been given to it, and the name which is probably most widespread, is "The New Photography"; it is a very good name, only it unfortunately labors under two disadvantages—first, the subject is not new, and second, a large number of eminent people will not allow that it is photography. I must admit, personally, that I do not quite understand the point of view of these persons. I take it that photography has to do with light, and I take it that light does not necessarily mean the kind of light that one can see; you talk of ultra-violet light, and you cannot see that; and you talk of infra-red light, and you cannot see that; and therefore it is difficult, and I do not think it is necessary, to restrict the word light to that particular form of vibration of the ether that affects the optic nerve. Captain Abney, who is, of course, a great authority, has suggested that the new process should be called "Electrography." That is not an easy word to pronounce, and I cannot quite understand his point of view. Not very long ago Lord Kelvin stated, when Hertz made his experiments which confirmed the electro-magnetic theory of light of Clerk Maxwell, that those experiments annexed to the domain of electricity the whole science of optics. According to the electro-magnetic theory of light, there is no distinction between electro-magnetic waves and light waves; there is no distinction between Hertzian waves and light waves; and it appears to me very difficult to draw any distinction between waves of the ether.

Now, having got so far, I shall begin at once and try some experiments, for this reason: These experiments that we try and these photographs that we take are rather uncertain; sometimes they are successful and sometimes they are not; the process has not yet been boiled down to the state that gives absolute certainty; and as these photographs take longer than usual to develop, it is very desirable that

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* Paper read by Mr. A. Campbell Swinton before the Camera Club, London. Reprinted from *The Journal of the Camera Club*.

MACFARLANE ANDERSON, PHOTOGRAPHER.

FROM SCHOOL OF PRACTICAL PROCESS ENGRAVING.

E. & H. T. ANTHONY & CO., AGENTS, 591 BROADWAY, NEW YORK

we should begin at once, so that, if by chance our photographs should prove unsuccessful, we should have plenty of time to do others.

[Mr. Swinton then placed on the table six dry plates, cut to lantern size, and each enclosed in a double black envelope ; purses, spectacles, etc., were laid on the plates, and a Crookes radiant matter tube fixed in position at a height of about 9 inches. The tube was illuminated by means of a Ruhmkorff coil, for twelve periods of fifteen seconds each, with alternate pauses of similar duration, to avoid over-heating and consequent fracture of the tube. The plates were then removed and developed, and the negatives obtained were shown on the screen at a later stage of the proceedings.]

The lecturer continued :

I have no doubt many members and a large number of the general public do not know the difference between what are known as "Crookes tubes" and what are known as "Geissler tubes," and I therefore propose to show you a number of both Crookes and Geissler tubes, so that you may understand more exactly what happens when we take these photographs. You have all seen ordinary electric sparks. (Shown.) Here is a bulb, which at the present time is full of air, and when I connect the terminals inside it with the Rhumkorff coil, and gradually exhaust the air by means of a pump, you will see the effect of the diminution of atmospheric pressure. As the pressure is reduced you will see that the nature of the discharge will change ; it first of all broadens out, and then it becomes discontinuous, and finally we shall fill the whole globe with an uniform glow. With a pump of this description it takes a long time to obtain very high vacua, such as are required for the experiments that we propose to show you, and consequently I will not try to exhaust this bulb up to the conditions necessary for the experiments, but I will pass on to other bulbs which have been exhausted elsewhere.

The chief distinction between Geissler tubes and Crookes tubes is this : First of all, in a Geissler tube the exhaustion is considerably lower than in a Crookes tube, and also in a Geissler tube the luminescence which is visible is due to luminescence of the residual gas. This is a Geissler tube with a rather complicated pattern of glass tubing inside it, in which there is a certain amount of air, but only a very small amount, and when I turn on the current you will see that this will light up, the difference of the colors being due to the different qualities of glass that have been used in the manufacture of the tube. Here is another Geissler tube with different fluid substances surrounding the inner tube through which the current passes ; and you will find that, although these fluids all appear of more or less the same color by ordinary electric light, when we turn on the current they will fluoresce with different colors. These two tubes which I have shown are Geissler tubes—tubes which have only a low amount of exhaustion, but when the exhaustion is continued much farther we get different phenomena —the Crookes phenomena. When I turn the current on to this Crookes tube, the tube itself will not be so brightly illuminated as was the case with the Geissler tube, but owing to certain radiations that take place from the large terminal, which I will connect with the source of negative electricity, this flat piece of mica coated with sulphide of calcium will become intensely luminescent. We have now passed from the stage in which gas contained in the tube is luminescent, and we have got to the state in which the gas is non-luminescent, and to the luminescence of a solid substance upon which the cathode rays from the negative electrode play. These Crookes tubes are exhausted to very high vacua—I believe to something less than one-millionth of an atmosphere. A large number of them are made in different forms, but we only propose to show two or three for the sake of illustration.

Here is one containing sulphide of calcium in fine powder at the bottom of the tube, and when the current is applied you will see that a large amount of phosphorescence is set up in the calcium, which continues even after the electrical excitation is stopped. This is a similar tube, but it contains nitrate of strontium, and it gives a yellow color, and only continues to luminesce slightly when the current is turned off. I will show one more tube to illustrate the different effects of these cathode rays upon various substances; this one contains a number of rubies, and the effect is very beautiful.

Now, having seen that certain substances are made to phosphoresce or luminesce with different colors when they are subjected to the radiations, whatever they may be, that proceed from the negative electrode of these tubes, it is interesting to note certain peculiarities of these radiations. I have here a tube in which the negative electrode is a plate at the back, and the rays proceeding from this plate would naturally be projected against the end of the tube, and would cause the glass of the tube to phosphoresce with a green phosphorescence, because it is German glass. But in the path of these rays there is an aluminium cross, and when I turn on the current the shadow of the cross will be thrown upon the glass, proving that the rays are propagated in straight lines. I will now remove the cross and again turn on the light, and you will see, instead of the black shadow cross, a white cross. This is a rather important feature, because it means this: After the glass has luminesced for a certain time it gets fatigued, and will not luminesce any longer; consequently, the portion that was protected from luminescing by the cross will luminesce more brightly than the portion that had become fatigued.

I will now show you another curious feature in connection with the rays from the negative electrode in a Crookes tube. We have here a tube in which the negative electrode is at the top, but in the path of the ray there is a piece of metal with a slit in it, so that the ray can only go through in the form of a narrow beam; and when the current is turned on you will see that by bringing a magnet near the tube I shall be able to deflect the beam; that is to say, the cathode rays are deflected by magnetism. This deflection of the cathode rays is one of their peculiarities, and one of the peculiarities that distinguish them from the X rays of Röntgen.

So far we have been dealing entirely with what takes place inside the exhausted tube, and up to about three years ago everything that was known with Crookes tubes had reference to what took place inside the exhausted space ; but a little more than two years ago Prof. Lenard, who had previously been assistant to Prof. Hertz, made a large number of very interesting experiments in connection with bringing the cathode rays outside the tube. He fitted an aluminium window to the tube, having found that glass was exceedingly opaque to these rays. Hertz had discovered that certain thin metallic films, notably aluminium, were more transparent to them, and that an aluminium tube of sufficient strength could be made thinner than a glass tube, and consequently Lenard put an aluminium window to his tube, and found that he was able to get the rays to come outside it. He not only discovered that, but also that these rays, after they had come through the aluminium windows, would produce phosphorescence in various substances outside the tube just in the same way as they had done inside it. He discovered more ; he discovered that these rays would affect photographic plates, and that they would do so although opaque substances were interposed in their path ; in fact, Lenard really did everything that Röntgen has done on a very small scale, except that he did not happen to try experiments upon portions of the human body or of other animal bodies.

Now, there are various theories as to what these cathode rays are, and also with regard to what the X rays are. The question of what the cathode rays really are is an old subject of controversy, and there are two schools of scientists with regard to the matter. Most English scientists, I believe, hold—with Crookes who investigated them, and, I believe, discovered them, and with Lord Kelvin, whose authority, of course, is very great—that the cathode rays really consist of electrified particles of the residual gas contained in the tube ; for, of course, although we are exhausting our tube as high as we can, there is a great deal of gas left. A calculation recently published by Prof. Oliver Lodge is very instructive in this relation. I spoke, I think, a little time ago, about the Crookes effects taking place when about a millionth of the natural atmospheric pressure was left in the tube ; according to Prof. Lodge, if we reduce the atmospheric pressure to a one hundred millionth of an atmosphere, there still remain in every cubic inch of the tube something like 1,540 billion complete molecules. So you see there are plenty left. The theory held by most English scientists, and, I believe, supported by Helmholtz among the Germans, is that the cathode rays consist of electrified particles of the residual gas, which being electrified similarly to the negative electrode by contact with it, are violently repelled. There is, however, another theory which is held by Lenard and other German scientists of great repute, and that is, that the cathode rays, like light, are some form of ether vibration.

Well, so much for the cathode rays ; but when we come to Röntgen photography we have to some extent ceased to have to do with the cathode rays, because we are dealing with what takes place outside the tube. We have also ceased to some extent to deal with what Lenard did, because we do not have an aluminium window. Further than that, it has been proved, both by Prof. Röntgen himself, and by very exact experiments made by Prof. Oliver Lodge, that the Röntgen rays after they have once got outside the tube are not affected in any appreciable degree by a magnet. Now, as you saw in the experiment a little while ago, the cathode rays are very appreciably affected by even a weak magnet, and therefore it seems reasonable to suppose that the X rays, as Röntgen calls them, are very different from the cathode rays that take place inside the tube. Whether it be that the cathode rays, after having filtered through the glass at the end of the tube become converted into something slightly different; or whether it be that the beating of the cathode rays upon one side of the glass sets up some form of vibration, or what not, on the other side of the glass, by some form of electrical induction or otherwise, it is impossible at the present moment to say. All we know is that the X rays outside the tube are not acted upon by a magnet, but the cathode rays inside the tube are. There are several theories with regard to what the X rays are. Some hold that they are electrified particles of matter again, exactly like the cathode rays inside the tube; the fact that they are not affected by a magnet seems to be in some degree against that theory. There is a theory that they are very long waves, and then there is a theory that they are very short waves, that they correspond to infra-red light, and that they correspond to ultra-violet light; and there is a further theory, and a very nice one, that they are longitudinal waves and not transverse waves. In order to render this last theory clear, I would like to give an illustration. The waves of the sea, in which the particles of water move at right angles to the direction in which the waves are traveling, are transverse waves; and it is known that the waves of light are transverse waves, similar to the waves of the sea. On the other hand, the waves of sound are longitudinal waves; if you take into account any particular particle of air in a sound wave, that particle of air does not move at right angles to the direction in which the sound is traveling, but it moves backwards and forwards in the same direction. Sound waves are a process of compression and expansion of the air, and longitudinal waves mean that process of compression and expansion; consequently, if we are to imagine that these X rays of Prof. Röntgen are longitudinal waves, we have to believe that the ether is compressible and expansible.

There is one very attractive feature with regard to this theory that the X rays are longitudinal waves of the ether. It is found by experiment with photography that the transparency of bodies to these X rays is more or less proportionate with their density. It has been a long time an idea that the action of gravity is due to some form of longitudinal wave in the ether, and it is consequently a very interesting feature of the X rays that they correspond in some respects to the action of gravity; it is an inverse respect, but still it is exceedingly interesting from a purely scientific point of view.

[Mr Swinton here took a photograph of the chairman's hand, the operation being similar to that described in the case of the purses, etc., and he then described the construction of the tube by means of a dia-

Phusogravure

"If I only had my gun, Sport!"

E & H.T. Anthony & Co.
AGENTS.

gram. A series of slides was then exhibited illustrating the nature of the positive and negative discharges and the discharge from a Tesla coil, and also a diagram showing the arrangement of the Tesla coil used by Mr. Swinton.]

Apart from the form of the tube, the chief practical requirements are these: First of all, you want a very high vacuum, as high a vacuum as the coil you are using will produce luminescence in; then you want to have the electrodes as far as possible apart; the tube must be of an uniform thickness of glass, so that it will not crack with the heat; and it is of paramount importance that it should be made of German potash glass, because that kind of glass answers much better than lead glass. These are the chief requirements, except that if you are going to do a large body you must have a large tube; and in order to get sharp definition you must put that large tube a long way off, because, of course, this photography is merely by shadow, and you will get sharper shadows if you either have a very small luminescent patch from which the radiations are proceeding, or if you have that patch a long way off; small objects, of course, can be done with smaller tubes, and can be put nearer; coins, etc., quite near to the tube, because they are almost in contact with the plate; but the bones are fixed in the body, and you cannot put them nearer to the plate than the flesh will allow, and in that case it is necessary to have either a small tube, or a large tube a long way off.

[A number of lantern slides prepared from Mr. Swinton's results were shown at this stage.]

Little remains to say, except that it appears to me that this discovery is really of great importance. It is important for surgery, because it gives one a means of seeing the interior of a body in a way that has never been possible before. But it also seems likely to be of great importance from a purely physical standpoint. It appears to me that in the course of the next few years—half a century or so—there is sure to be some great generalization which will proceed from all the enormous amount of knowledge that at the present moment is being acquired upon all subjects. The amount of knowledge that has been acquired during this century upon scientific subjects is immensely greater than in all the previous centuries of the world put together. People are very fond of saying "So-and-so discovered this," and "So-and-so discovered that," and in many cases the people whose names are associated with certain discoveries deserve great credit. I would not for a moment wish to minimize the credit due to Röntgen in connection with the discovery of which I have had the pleasure of showing you some illustrations this evening; but it must be remembered that Röntgen simply built upon a foundation laid by Lenard, Crookes and Hertz, Hertz by Clerk Maxwell, Clerk Maxwell by Faraday, and so forth. The ancient Greeks believed that Minerva sprang fully equipped from the head of Jove, but in this age we know better. We know that knowledge, and the discoveries that make knowledge, do not proceed from single brains, but are subject, as everything else, to the law of evolution, and are the result of the cumulative working of many minds.

AMATEUR PHOTOGRAPHY—EN VOYAGE.

THE tourist who is wise enough to provide a hand camera for use *en voyage* will never regret the forethought or the cost of it. For some years I stubbornly resisted this suggestion, and, in consequence, all my earlier transatlantic voyages are now a very confused memory while the later voyages, on which I have used a camera, are clearly defined and are frequently lived over again, when I have an opportunity to enjoy my albums of views depicting events which now belong to the past. Not only in this manner does it repay the tourist, but also in the pleasure it affords others. Towards the end of one of my voyages to Europe, made in the high season of travel when the ship was crowded, at the suggestion of one passenger, nearly forty others paid me the estimated cost of getting up an album of the views taken on that voyage. After my return here, the following winter, I gave the order to have them made, and sent to each one as promised, and now, whenever I meet any of these old *compagnons de voyage*, they invariably express the pleasure it still gives them to look through their album and go over that voyage, with its views to aid the memory. I have, of late, carried one or two of my albums with me on my voyages, and when time begins to hang heavily, and fellow-passengers long for something to look at (for very few people care to read on board ship), I have produced my albums, and sometimes have not seen them again for several days, because the passengers have passed them around from one to the other; but, during that time, many of them have accosted me and have expressed the pleasure they have derived from looking over the views.

PROMENADING UNDER DIFFICULTIES.

It is, I understand, "quite the thing" in the season to go to the dock and see one's friends off, and the European steamship companies seem to favor the idea by throwing open both dock and ship to passengers and their friends on sailing day. The consequence is a very confused condition of affairs on the dock and also on board ship until the last plank has been thrown off and the ship is under way, generally assisted by a "tow" until the outer buoy is reached.

The first day on board, if the weather is fair, is frequently passed very comfortably by most of the passengers. So much so, that they begin to consider themselves fairly good sailors, and to hope that they will entirely escape nausea ; but the first night on board generally reduces the apparent number of passengers, many of whom may not be visible for a day or two, or, if they are, prefer to be considered invisible, and, as a rule, to be left to themselves, without kind expressions of sympathy or—anything else. Others, who are so fortunate as to escape this experience, rather enjoy the excitement of a little nasty weather, if it does not last too long, and, while walking on deck may not be too easy at first, the hurricane deck is generally dry to leeward, and on the forward end of it a group will often collect and watch the ship's bow rise and fall, as she steadily forces her way through the wild waters, very often resulting in shipping a sea.

MOONLIGHT AT SEA.

After a storm or a heavy gale of wind, those who have been confined to the saloon are often very glad to venture out on deck, although there may still be a heavy swell, causing the vessel to roll or pitch, so that promenading can only be indulged in by the expert, and with difficulty then even by them.

Sometimes the Captain finds it impossible to "take the sun," especially in very cloudy or foggy weather ; but, as the log has to be recorded, and also many bets are sometimes dependent upon the result of the ship's run for the past twenty-four hours, an average of miles is made by the aid of reckonings, mechanical devices and the chief engineer's report, and the day's run is posted up in the saloon companionway for the edification of the passengers.

In pleasant weather the deck steward, upon request, will produce the necessary implements and mark the spaces off on the deck for a game of shuffle-board, which, while it requires some practice, is soon learned, and afterwards affords plenty of good, vigorous exercise to as many as eight persons at one time — four on a side—although two, four or six persons can play a complete game, divided equally by sides, with just as much interest.

"TAKING THE SUN."

Another game, called quoits, provided by all the European steamship companies, is also enjoyed very enthusiastically by many, though it requires more patience and practice to become skillful, and does not afford the vigorous exercise that the game of shuffle-board does.

QUOITS.

On the voyage towards Europe, the direction being northerly, the twilight lengthens perceptibly each evening, and, if followed by moonlight, very much more enjoyment is experienced than during that period of the month when the evenings are dark. It is well for those who can do so to consult their calendars, and, if possible, arrange for their voyage to be made during moonlight evenings.

A day or two before the coast of Ireland is sighted, "Irish Beggars" (the sailor's name for sea-gulls) come out to meet the ship, and follow along in its wake all the way to Ireland, gracefully swooping down to the water whenever any refuse is thrown out from the cook's galleys, and floating on the surface of the water, or disappearing beneath it when necessary to secure a "tit-bit" which has commenced to sink.

When the wind is easterly the fragrance of earth is very pronounced, and is welcomed several hours before land is sighted. The first glimpse of land, apparently clouds low on the horizon, is soon followed by very interesting panoramic views of the peaceful, fresh green and still wild rock-bound coast of the Emerald Isle, reminding those who have been "down East" of the beautiful coast of Maine. The ship's engines generally stop for the first time off Roche's Point, Queenstown, where it is usually met by the steamship company's tender, bringing friends to greet some of the passengers, letters and news of the outer world, which has been almost forgotten, as well as the all-important pilot, and taking away those who desire to land in Ireland, and the mails, which are forwarded by local mail boats and rail to London.

OFF QUEENSTOWN.

Other boats also come to the ship's side, bringing the Queenstown pilot, fresh water, vegetables, and, if there is time, "bumboats," usually owned and steered by Irish women, who are ungracefully hauled up the ship's side by means of a rope on which they sit, keeping their feet going very nimbly, as they are being hauled up to the deck.

ROCHE'S POINT.

The lengthened evenings off the Irish Coast always cause comment, and the slowly darkening twilight is very pleasant if the weather is warm enough to be out. It is almost always cloudy off Ireland, but the air is soft, and so mild that the evening can usually be passed on deck. The strange-appearing coastwise craft, constantly being passed, cause some excitement, and, while sailing up the Irish Channel, the numerous fine vessels going to and coming from all parts of the world are a very interesting sight after so many days of absence from all but sea and sky (or clouds).

After passing the sand-bar across the mouth of the River Mersey, many fine marine and cloud views can generally be obtained as the ship passes up the river, if the weather is at all suitable and the time of arrival is favorable to exposures. WALTER SPRANGE.

ON A NEW METHOD OF PREPARING PLATES SENSITIVE TO THE ULTRA-VIOLET RAYS.

BY V. SCHUMANN.

Translated from the *Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften, Math.-Naturwiss Classe. Band CII, Heft VIII, Wien*, October, 1893, pp. 994–1024.

COMMUNICATED BY COL. J. WATERHOUSE, I. S. C.

(*Continued from page 131*).

THE following paper treats of my own personal labors. These include a series of researches which, in consequence of the not inconsiderable difficulties which were caused at first by the necessity for taking these pictures of the spectrum in a vacuum, have occasioned great expenditure of time and trouble. I have therefore contented myself with single trials of the respective experiments in cases where the verifying of the first results seemed to me superfluous. These results are naturally of inferior value, and it might, perhaps, have been better if I had passed them over in silence. My paper would then have been so incomplete that their admission into it seemed to me to be the least of two evils. I shall, however, suitably note them in what follows, so that the possibly doubtful worth of one or the other of them may not influence the principal results of the investigation.

SPECTROGRAPHIC PREPARATORY WORK.

The spectrum in the ultra-violet was already known as far as w. l. 185.2 $\mu\mu$. In 1890 I succeeded in discovering waves of shorter length as far as w. l. 182 $\mu\mu$ by means of photography. Beyond this the photographic plates failed; whether from want of sensitiveness or from the insufficient energy of the source of light, nothing further could be determined. The only possibility of obtaining an elucidation of this point lay in the measurement of the transparency to light of the different components of the sensitive coating of the plates. I used for this purpose gelatine dry plates containing gelatine and silver bromide.

Dry gelatine, as I was the first to show,* absorbs the ultra-violet rays very powerfully, and the more so in proportion to their refrangibility. A film only 0.00004 mm. thick is sufficient to weaken very sensibly rays of about w. l. 185.2 $\mu\mu$.

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* See Vol. cii, Part 2, 1893, pp. 457–464.

The coating of a gelatine dry plate is at least 500 times thicker. Consequently, waves of shorter length have not the power of penetrating the sensitive depths of such a film, nor of reducing a sufficient quantity of silver haloid, to give a dense image. From this it may be concluded that the gelatine was not without a share in the loss of intensity of my pictures of the spectrum, and that a film of pure silver bromide might have given a better effect.

Pure silver bromide also stops the rays of light energetically ; however, according to my photographs, it is rather more transparent for the wave-lengths 210 $\mu\mu$ to 185 $\mu\mu$, than for the rest of the spectrum This slight difference was practically of little importance. Of much more importance was the extent of the extinction which might result photo-chemically or photo-thermically. The absorption spectrum failed to elucidate this point. The photographic behavior of pure silver bromide could alone decide it.

With this object I coated a glass plate with a thin film of silver bromide, which had been precipitated with an excess of alkaline bromide, dried it and with it took a photograph of the spectrum of the spark between two aluminium wires, using a quartz prism and lenses. The plate was developed like a gelatine dry plate, with pyrogallic acid, soda and potassium bromide. The thickly fogged plate showed a continuous spectrum which extended as far as wave-length 182 $\mu\mu$ in undiminished intensity, as a deep black band of action, bordered all round by a light edge. The continuity of this band was entirely owing to the spreading of all the lines together, an appearance which also occurs with gelatine plates of much higher sensitiveness.

From this negative I concluded that the modification of silver bromide in gelatine emulsion is not wanting in any way in sensitiveness for the most refrangible rays, nor these in photo-chemical energy, but rather that the want of sensitiveness of silver bromide in gelatine was a consequence of the weakening of the rays which these suffer on their passage to the silver bromide through the gelatine. Hence, it was to be expected that the sensitiveness of silver bromide plates could be increased by diminishing the quantity of gelatine, by substituting some more transparent binding medium for the gelatine, or, finally, by doing away with the binding material. This would only answer for the selected region of observation which ends with w. l. 182 $\mu\mu$. I therefore repeated these experiments for the more strongly refracted region lying near, taking care, however, to reduce the air-space between the source of light and the plate, which I had already previously recognized as an important absorbent for short waves of light, to a layer of only a few millimeters' thickness. In this way it was proved that a region rich in rays existed beyond 182 $\mu\mu$, and also that for photographing this, pure silver bromide is sufficiently sensitive.

These photographs on pure silver bromide form the basis for the preparation of my plates sensitive to the ultra-violet rays, which is treated in the following section of this paper.

PREPARATION OF PLATES SENSITIVE TO THE ULTRA-VIOLET RAYS.

This was tried in three ways, by coating with emulsion, by bathing in silver nitrate and potassium bromide solutions, and by coating with precipitated silver bromide.

A.—BY COATING WITH EMULSION.

My endeavors to obtain an ultra-violet sensitive plate with emulsions of silver bromide have given no practical results. They are only mentioned for the sake of completeness.

I hoped, with a silver bromide emulsion containing two to three times as much silver bromide as usual, to obtain a coating poor in gelatine, which would have allowed the rays to penetrate to a greater depth and given a more intense picture than is possible with ordinary silver bromide in gelatine. I obtained, however, the exact reverse of this. The silver bromide settled regularly at the bottom, even before the poured-out emulsion was set, so that the uppermost surface of the coating of the plate, which in this case is alone of service, consisted merely of gelatine. Plates of this kind were, from the reasons already explained, more insensitive for the most refrangible rays than ordinary dry plates.

An attempt to replace gelatine by agar-agar was still more unsuccessful: the coating of the plate separated, as soon as it was set, into particles of varying sizes, an appearance which had already, some years before, prevented me from using agar-agar for emulsion purposes.

B.—BY IMMERSION IN SILVER NITRATE AND POTASSIUM BROMIDE SOLUTIONS.

If a plate coated with gelatine is dipped in a solution of silver nitrate and then in a solution of potassium bromide, a coating of silver bromide is obtained, of which the outer surface is formed of silver bromide without any gelatine. When such a plate is exposed to light the rays pass first through the silver bromide free from gelatine, and then through that which is enclosed in gelatine. From this film of silver bromide free of gelatine I anticipated good results in photographing the smallest wave-lengths.

I coated a leveled glass plate with a 3 per cent. solution of gelatine, and, as soon as the coating was set, immersed it in a 5 per cent. solution of silver nitrate, let it drain, cleaned back and sides with blotting-paper, then immersed it again in the darkroom in a 3 per cent. solution of potassium bromide and washed it, the coated side being downwards and the water changed constantly. After drying, it was exposed to the spectrum of aluminium, and then developed with pyro-soda and potassium bromide.

The dried opalescent unexposed plates were found to be unevenly transparent, and showed numerous irregular streaks. They fogged completely on development, and could only be kept clear by strongly diluting the developer. However, the lines were in all cases sharply shown, even when the plate fogged, and more intense than with a

MACFARLANE ANDERSON, PHOTOGRAPHER FROM SCHOOL OF PRACTICAL PROCESS ENGRAVING E. & H. T. ANTHONY & CO., AGENTS, 591 BROADWAY, NEW YORK

silver bromide emulsion. The photographic maximum of the plate exposed to aluminium light was about the two lines at 186.0 $\mu\mu$ and 185.2 $\mu\mu$. Both always developed much earlier than the other parts of the spectrum.

Gelatine emulsion plates behaved just the opposite, these lines always appearing last.

Gelatine bath plates consequently have an advantage over emulsion plates for photographing the most refrangible rays.

These photographs ended at wave-length 185.2 $\mu\mu$. The cause of this moderate range must be sought, however, not in the plate, but rather much more in the fact that its exposure was under the influence of an air space intervening in the path of the rays, and this, as before shown, is very slightly transparent to the ultra-violet rays.

The general sensitiveness of the gelatine bath plates was only moderate, and to have increased it, as was desirable, would have been difficult. I therefore contented myself with a single trial of this method, and, without exposing plates to the wave-lengths beyond w. l. 185.2 $\mu\mu$, passed on to the last of the methods given, which, in other respects, also promised better results.

C.—By Coating with Precipitated Silver-Bromide.

If solutions of silver nitrate and potassium bromide are mixed, a flocculent precipitate of silver bromide is obtained. Very dilute solutions behave otherwise. They give, with an excess of potassium bromide, an extremely fine precipitate, which first remains suspended and only settles after standing for weeks.

The addition of a few drops of ammonia increases the deposit and hastens the settling.

If a glass plate be laid at the bottom of the settling vessel, the silver bromide falls on it in a layer of even thickness, and, after the supernatant fluid has been syphoned off, dries in a short time to a dull yellowish coating, consisting of pure silver bromide with a small mixture of the salts dissolved in the supernatant fluid, KNO_3 and KBr, which can be removed by washing. Such plates stand development, and also, to a certain extent, the fixing, without injury.

The above is a rough outline of the method I have used for years for preparing plates which have enabled me to find the limits of the spectrum between wave-lengths 182 $\mu\mu$ and 100 $\mu\mu$.

(*To be continued.*)

PYRO DEVELOPMENT.

THE professional photographer usually follows a fixed rule regarding the making of his developers, and is not easily beguiled into straying from his beaten path. It is a fact that most of the developing formulas published so closely resemble one another as to be equally convenient and effective. Indeed, it has been usual to add a grain or two of material and affix a new name, and claim the formula as original. There is, however, a certain degree of convenience that it is desirable to attain in professional work, and a developer that can be made up in considerable quantities and used without trouble and with perfect knowledge of its capabilities, will, we think, be welcome. Messrs. Davis & Sanford, whose magnificent work on Climax plates has attracted the attention of photographers all over the country, have favored us with their formula, and we think that for convenience, permanence, and general adaptability to the requirements of professional photographers it cannot be excelled. We present it to our readers herewith :

Carbonate of soda	60 degrees hydrometer.
Sulphite of soda	40 " "
Pyro	1 ounce.
Water	12 ounces.
Oxalic acid	16 grains.
Sulphuric acid	10 drops.

For use take :

Sulphite of soda solution	½ ounce.
Carbonate of soda solution	½ "
Pyro solution	1 dram.
Water	3 ounces.

It will be noted that there are three stock solutions, all of which are easily made, and which will with proper precaution keep almost indefinitely.

PRIZES OFFERED BY THE PHOTOGRAPHERS' ASSOCIATION OF OHIO.

Convention at Columbus, July 14, 15 and 16, 1896.

Special Prize.—For competition by all photographers of the United States and Canada, outside of Ohio. One picture, 16 inches, or larger. One gold medal.

Grand Prize.—Open to competition by members of the Photographers' Association of Ohio only. Six pictures, 16 inches, or larger ; nine pictures, Paris panels, to 13 inches ; twelve pictures smaller than Paris panels. Prize to consist of a suitable object of art.

Class A.—Six or more pictures, 13 inches, or larger. First, one gold ; 2d, one silver ; 3d, one bronze medal.

Class B.—Twelve or more pictures, Paris panels, to 13 inches. First, one gold ; 2d, one silver ; 3d, one bronze medal.

Class C.—Twenty-four or more pictures smaller than Paris panels. First, one silver ; 2d, one bronze medal.

Class D.—Six or more pictures, Paris panels, to 13 inches ; twelve or more pictures smaller than Paris panels. First, one silver ; 2d, one bronze medal.

Note.—Competitors in Class D must be from cities of 15,000, or under.

Class E.—Four or more pictures, Paris panels, to 13 inches ; twelve or more pictures smaller than Paris panels. First, one silver ; 2d, one bronze medal.

Note.—Competitors in Class E must be from towns of 5,000, or under.

Class F.—Best general display, no limit to size or number. One bronze medal.

Note.—Competitors in Class F must be from towns of 1,000, or under.

Class G.—Best group, 7 inches, or larger. One bronze medal.

Class H.—Landscapes. Six or more pictures, 7 inches, or larger, with or without figures. First, one silver ; 2d, one bronze medal.

Class I.—Interiors. Six or more pictures, 7 inches, or larger. First, one silver ; 2d, one bronze medal.

Class J.—Commercial work. Six or more pictures, any size. One bronze medal.

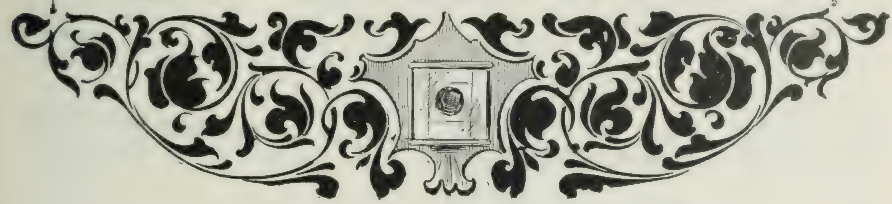
Rules and Regulations.

Competitors for Grand Prize and Class A cannot compete in any other portrait class, excepting Class G.

Members from towns of 15,000, or smaller, may compete in any class, subject to the rules governing same.

Photographers outside the State, desiring to compete for Special Prize, are required to accompany their entry with a fee of $2, thus becoming honorary members.

SOCIETIES



Photographers' Association of America.—The 1896 convention will be held at Chautauqua, N. Y., June 22d to June 27th. Full details regarding trains, hotels, etc., can be obtained on application to the Secretary, J. Will Kellmer, Hazleton, Pa.

* * *

Photographers' Association of Iowa.—1896 Convention at Des Moines, Ia., May 5th to May 7th. Secretary, J. R. Hall, Monroe, Ia.

* * *

Société Photographique de Lille.—The Salon of 1896 has been postponed to June 27th. Entries received up to June 13th. Address Société Photographique de Lille, 116 rue de l'Hôpital-Militaire, Lille, France.

* * *

Halifax Camera Club.—New club, organized March 30, 1896. Officers: President, W. A. Henry; 1st vice-president, E. A. Wilson; 2d vice-president, G. A. Garvin; treasurer, B. P. Saunders; secretary, C. E. W. Dodwell, Halifax, N. S.

* * *

Messrs. Queen & Company.—Two years ago the firm of J. W. Queen & Company failed, and Mr. John Gordon Gray was made receiver. Now the receivership is ended and the company begins with assets of $200,000 and a constantly growing business. The officers are: President, J. G. Gray; vice-president, S. L. Fox; secretary and treasurer, J. M. Hazel.

* * *

Simpkinson & Miller.—Owing to a most decided increase in business, the result of careful attention to the wants of customers, Messrs. Simpkinson & Miller have moved to new and much more commodious quarters, at 433 and 435 Elm street, Cincinnati. They carry a full line of everything required by professional and amateur photographers. We wish our friends continued success.

* * *

Allen Bros.—A rather novel advertisement in this issue of the Bulletin is likely to attract considerable attention. Messrs. Allen Bros. will, for 30 cents, send by mail a sample and suggestion which will prove of value. Our readers can be assured that they will receive full value for their money.

* * *

W. P. Buchanan.—A handsome and very complete new catalogue has just been issued by W. P. Buchanan, the popular Philadelphia photographic stock dealer. It is one of the best printed catalogues that we have seen, is abundantly illustrated. Free to professionals, and mailed to amateurs on receipt of 12 cents to cover postage.

* * *

Metacarbol has displaced the other new developers. Read in our advertising pages what some of the most prominent photographers in the country think of it.

PROCESS WORK

WITH this issue of the Bulletin we make a decided effort to gain the support of those engaged in the photo-reproduction processes, and also in the printing arts generally. It will be our endeavor in future issues, as in this, to present to our readers practical matter on the illustrative arts, written by men who are acknowledged authorities. The present issue contains much that will interest every one engaged in photography or in process work. Our frontispiece is an excellent demonstration of the capabilities of the phusochrome process, and our readers will notice that it, as well as the magnificent half-tones which are sprinkled through this issue, was made at the School of Practical Process Engraving. In our advertising columns some details regarding this school will be found, and we may say that the school has been founded in order to meet the clamorous demands for really practical instruction in process work. Such instruction cannot, we believe, be obtained anywhere else to-day. The practical part of the school is conducted by two men well known to all connected with photography and photo-engraving. If any testimonial as to their ability were needed, the frontispiece and half-tones in this issue would speak as to their ability in the engraving line, and the fact that Mr. Anderson presided at the camera when the negatives were made stamps him as a photographer of no little merit. The school will instruct in any branch of reproduction, be it collotypy, photogravure, half-tone, zinc etching, photo-lithography, or color work. Full details can be obtained on writing to our publishers, who are agents for the school. Further, diplomas will be issued to those receiving instruction, giving an idea of what has been demonstrated to them, and testifying to their capabilities. In this way a standard will be set, which we feel sure will be appreciated by all engaged in process work. The Bulletin will be the official organ of the school, and every issue will contain work demonstrating what is being done there.

We want every engraver, lithographer, electrotyper, stereotyper and printer on our subscription list. We have the majority of photographers, and, with the increase in circulation that will come from the accession to our subscription list of the great army of process workers, we shall be able each month to increase in size and in quantity of illustrations, and thus make our journal more valuable to each and every reader. It is impossible to conduct a publication like this without some help from those who read it. We cordially invite and heartily solicit assistance from all our readers. The Bulletin is an arena for discussion.

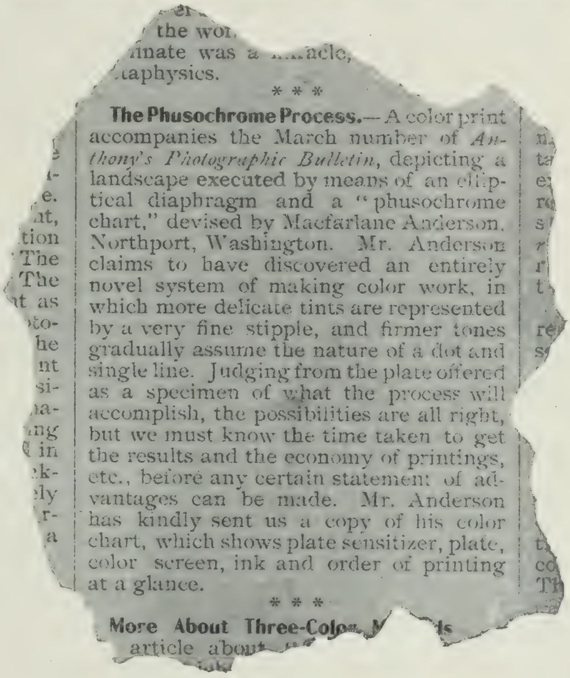
THE PHUSOCHROME COLOR PROCESS.

In answer to the accompanying clipping from *Paper and Press* of April 4th, commenting on the phusochrome color process, I would say that the "results" are the outcome of three printings. Therefore, from an economical standpoint, I believe this feature leaves nothing to be desired.

In the "time" taken to get these "results," I can only say that, color screens and spectral inks being correct (as in our case), the difficulties are entirely overcome in this direction.

Certainly there are many other factors to be taken into consideration, such as an entire freedom in any process of "diaper" or "watered" effect in the color print. This, in our case, after much investigation, has been overcome, and every set of color blocks can be relied upon as free from this annoyance.

Prices for sets of color blocks by our system in any quantity of color prints will be quoted on application to the process department of the publishers of the Bulletin.



* * *

The Phusochrome Process.—A color print accompanies the March number of *Anthony's Photographic Bulletin*, depicting a landscape executed by means of an elliptical diaphragm and a "phusochrome chart," devised by Macfarlane Anderson, Northport, Washington. Mr. Anderson claims to have discovered an entirely novel system of making color work, in which more delicate tints are represented by a very fine stipple, and firmer tones gradually assume the nature of a dot and single line. Judging from the plate offered as a specimen of what the process will accomplish, the possibilities are all right, but we must know the time taken to get the results and the economy of printings, etc., before any certain statement of advantages can be made. Mr. Anderson has kindly sent us a copy of his color chart, which shows plate sensitizer, plate, color screen, ink and order of printing at a glance.

* * *

Lastly, there is absolutely no cutting on the block whatever, the color values being obtained by pure process methods. Parties desiring to see the set of blocks from which this frontispiece was printed can be accommodated at 591 Broadway.

Macfarlane Anderson,
A. C. Austin.

PROCESS NOTES.

There has been much attention given lately to the make or kind of lens which should be used in half-tone reproduction methods.

Dr. Eder has said much regarding the distance of the screen from the sensitive plate, and the relation of the stipple in these investigations.

When it is remembered that a Goerz lens was used in these operations, the results secured by Dr. Eder will not seem so much at variance with results secured by those using a symmetrical or rectilinear lens, seeing that the spread of rays in the latter lenses are at a much smaller angle to their optical axis.

The nature of the stipple in a half-tone plate is more difficult to command when using a short focus lens, screen and plate admitting of little change in separation.

With a long-barreled lens, on the other hand, any effect obtainable is at the intelligence of the operator, separation and stop allowing great latitude in effects.

COLOR PIGMENTS AND SCREENS.

In reply to those desiring my opinion on the nature of color screens required in the three-color process, I would say the first requirement for success in this work is absolutely true spectral colors.

A color screen may fulfill a spectroscopic test and be a dismal failure in practical work. Should any worker desire the address of a manufacturer of these true spectral inks, I shall be pleased to forward the same on receipt of letter.

Screens to be used in conjunction with these inks may be made as given in any manual. Those made by A. C. Austin and myself are listed by the publishers.

It will be found more satisfactory in many ways, when making three-color negatives, to use the screens in front of the lens, instead of behind. Do this, and certain features of annoyance showing up in the after work will disappear.

SCREEN AND STOP RELATION.

In his "Theory of the Screen," E. Deville gives some very valuable and useful information in his classification of screens and stops, page 56. No wide-awake process worker should be without this useful little book, as there is much in it ready to hand that would otherwise require years of patient labor to acquire.

DYES FOR COLOR SCREENS.

The under-mentioned are some of the dyes found useful in the making of color filters. The exact quantities for use in any particular screen can only be found by experiment with the plate selected for use.

For the Blue.	Red.	Green.
Hoffman violet,	Chrysoidin,	Malachite green,
Methyl violet,	Aniline yellow,	Iodine green.
Crystal violet.		Metanil yellow.

Macfarlane Anderson,
591 Broadway,

The amateur photographer should study photo-engraving. The principles are not difficult to grasp, and with workers actuated by a desire for knowledge the various processes might be considerably improved.

Some few copies of the March Bulletin, second edition, remain unsold. This number contains Anderson's phusochrome chart, and much valuable information on photography and process work.

A NEW PYROXYLINE SOLVENT FOR PROCESS COLLODION.

BY A. C. AUSTIN.

It has been my good fortune to have part in a series of experiments with a newly discovered chemical combination in its application to process photography, and as these experiments have been eminently satisfactory, proving beyond peradventure the unqualified success of the new agent, it gives me the greatest pleasure to be privileged to first present it to the fraternity at large. I also consider the opportunity as bearing with it much honor, for, although not on a plane with the eminent chemist and inventor, the fact that I can point out an advantage to my fellow-workers is in itself no small affair—and although there is no financial advantage, there is a glow of satisfaction in being useful. Mr. Gustavus Michaelis, Professor of Chemistry in the Albany College of Pharmacy, and chemical specialist of the Albany Chemical Company, a gentleman modest and unassuming, but with a fund of knowledge acquired through years of study and practical experience, the inventor of valuable patent processes for the manufacture of chloroform, ethyl nitrate and other important chemicals, was induced, through the solicitation of a collodion paper manufacturer, to experiment in solvents for gun-cotton as applied to the photographic arts.

Though fully aware of the years of experimenting along this particular line on the part of some of the foremost chemists of the world, the Professor, nothing daunted, began his task.

He found several agents that would dissolve the gun-cotton, but they all lacked the necessary qualities to make them useful in photography, from the fact that they were incompatible with the sensitive chemicals and formed granular and unmanageable films. After nearly two years of patient study, the Professor finally devised a method of combining methylic alcohol with methylic ether gas, in such a manner as to at once purify and endow it with the properties of as perfect a solvent as is sulphuric ether and absolute alcohol. The first of this product was submitted to the collodion paper manufacturer, who immediately accorded it unqualified success, claiming for it not only a great saving in expense over alcohol and ether, but several additional advantages. On the strength of this practical demonstration the Professor protected his process by patent and gave the control of its manufacture to the company with which he is connected, and they now manufacture the solvent in large quantities and ship it to the collodion paper manufacturers.

The experiments in connection with its application to negative making are of more recent date, and, with the Professor, I have come to the conclusion that the solvent, with slight modification, makes a superior article for process collodion, giving an almost perfect film—and as it is considerably cheaper than alcohol and ether, it is indeed a boon for the fraternity. The method of making the collodion is quite simple. The solvent being in one solution, it is only necessary to add the required amount of cotton, which is almost instantly dissolved. The salts are dissolved in a separate portion of the solvent and added to the plain collodion, and after a day or so for "ripening," or the addition of a little iodine tincture to "color," is ready to use.

It seems strange that this important chemical has so long evaded the search of chemists, and yet the reason is simple enough from the fact that it is a gas: and, although this gas has been used as a refrigerating agent when in its liquefied condition, it was never examined for its dissolving qualities. To Prof. Michaelis belongs the honor of its discovery for this purpose. The particular method of combining this gas with the alcohol forms the basis of the patent, and, as it may be of interest to know something concerning this process, I have procured a copy of the patent, which is given herewith.

A. C. Austin.

UNITED STATES PATENT OFFICE.

Gustavus Michaelis, of Albany, New York, Assignor of One-Half to William T. Mayer, of Same Place.

COLLODION.

Specification forming part of Letters Patent No. 556,017, dated March 10, 1896.
Application filed September 13, 1895. Serial No. 562,463.
(No specimens.)

To all whom it may concern:

Be it known that I, Gustavus Michaelis, of Albany, in the County of Albany and State of New York, have invented or discovered a new and useful improvement in collodion, of which the following is a specification:

Methylic ether has a powerful solvent property for certain substances. Absorbed by certain liquids it imparts a solvent property to the same or greatly increases their solvent properties.

The value of methylic ether for imparting a solvent property to a liquid, or increasing the solvent property of a liquid, is, perhaps, greatest when methylic ether is used with methylic alcohol. A solution of methylic ether in methylic alcohol will, for example, have a very powerful property of dissolving gun-cotton, or at least that kind which heretofore has been commonly known as "pyroxyline." A solution of gun-cotton thus made will yield upon evaporation a cohesive film capable of use for medicinal purposes, as well as in the arts generally, including the art of photography, providing the solution of gun-cotton shall have been sensitized.

To give a more detailed illustration, I may make a mixture of sulphuric acid and methylic alcohol of about equal parts, subject the same to distillation at a low temperature, and lead the gases thus produced into a cooling apparatus to remove condensable by-products as much as possible, and then into a solution of caustic alkali to remove sulphur dioxide and carbonic acid, then over calcium chloride to eliminate traces of water, and, finally, into methylic alcohol or liquids productive of the same feature. The cheapness of methylic alcohol makes it desirable, in addition to its great solvent properties, when used with methylic ether. I allow the gas obtained as above described to enter such liquid and become absorbed by it, thus finally obtaining a solution containing the gas in liquid form.

Collodion may be made by dissolving gun-cotton, or at least that kind which has been commonly termed "pyroxyline," in methylic alcohol containing methylic ether. By the term "gun-cotton" I wish to include all gun-cottons and analogous materials which are soluble in this mixture. Celluloid or analogous material may be dissolved by the same means. Any of these solutions may be made in the manner commonly pursued in making solutions of gun-cotton, or of celluloid or analogous material with other solvents.

MACFARLANE ANDERSON, PHOTOGRAPHER. FROM SCHOOL OF PRACTICAL PROCESS ENGRAVING. E. & H. T. ANTHONY & CO., AGENTS, 591 BROADWAY, NEW YORK.

What I claim as new and desire to secure by Letters Patent is:

First.--The process of making collodion, consisting in dissolving gun-cotton with methylic alcohol containing methylic ether, substantially as set forth.

Second.—The process of making collodion, which consists in dissolving gun-cotton in a liquid containing methylic ether.

Third.—Collodion, consisting of gun-cotton dissolved in methylic alcohol and methylic ether, substantially as set forth.

Fourth.—Collodion, consisting of gun-cotton dissolved in a liquid containing methylic ether.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

GUSTAVUS MICHAELIS.

Witnesses:
ANTHONY GREF.
JAC. KLEMANN, Jr.

THE WET COLLODION PROCESS.

BY S. H. HORGAN.

THE late Mr. J. Traill Taylor had the good fortune of few other men, to be a witness to the development of the wet collodion process from its invention to the present day. He personally tested every possible suggested variation of the method, and has left us, in almost the last work that he did, a *résumé* of the whole process of wet-plate negative making. It is invaluable to the process man, and can be found filling thirty-six pages of the *British Journal Almanac* for 1896. So many inquiries reach us regarding collodion, the silver bath and developer, that the following condensed excerpts from Mr. Taylor's notes will be valuable:

The collodion process, the invention of Frederick Scott Archer, was first published in the *Chemist* in 1851. It was Archer's intention to strip the films from the glass support, as, at present, done in reversing for photo-engraving. The productions by the collodion process have long been held up as standards of excellence, to which gelatine workers might attain.

Collodion is easy of preparation; the soluble cotton has much to do with its quality. Place 80 grains of cotton in a 16-ounce bottle, and pour over it 4 ounces of alcohol, and, later, 6 ounces of ether. Label the bottle "plain collodion," and put it away for use, as required. It will improve with age, and become as limpid-looking as distilled water.

To iodize the collodion, dissolve:

Iodide cadmium	65 grains.
" ammonium	25 "
Bromide cadmium	19 "
" ammonium	11 "
Alcohol	5 ounces.

This dissolves easily, and is added to 15 ounces of pure collodion.

THE SILVER BATH.

The formation of the silver bath, according to Mr. Taylor, is one of the simplest feats known in chemistry. It suffices to dissolve nitrate of silver in distilled water in the proportion of from 30 to 40 grains of the salt to each ounce of water. If a lightly iodized collodion is employed, then will a 30-grain bath prove amply sufficient; but for such a bromo-iodized collodion as that for which we gave a formula in the last chapter we would advise a 35-grain bath, the reason being that the greater the quantity of bromide in the collodion, the stronger should the bath be.

As soon as the nitrate of silver has dissolved, the bath is ready for use, subject to one thing.

One method of iodizing the bath consists in dissolving the silver in about one-half the water decided upon, and to this adding a few drops of a strong solution of iodide of potassium. This will immediately cause a formation of iodide of silver that, by shaking, will be redissolved by the strong nitrate solution. The remainder of the water is then added, by which the surplus iodide will be precipitated, for the weaker the silver solution, the less iodide is it capable of holding in solution. After having been filtered, the bath is ready for use.

The Developer.

The formula which he gave for developer was:

Protosulphate of iron	¼ ounce.
Acetic acid	1 "
Alcohol	½ "
Water	8 ounces.

Intensifying.

Density, should the image be too thin, can be imparted by a variety of methods, such as the application of a fresh quantity of the developer, to which a few drops of silver solution have been added. A popular intensifier consists in pouring over the thin image a 3-grain per ounce pyrogallic acid solution, in which has been dissolved 2 grains of citric acid, and an addition made to it of a few drops of silver from the bath. This rarely fails to impart great intensity to the image, and, when attained, the negative is fixed in a solution of hyposulphite of soda or cyanide of potassium, the former being preferred for negatives and the latter for positives.

Another method of intensification is to form a bromide of copper solution by dissolving equal parts, or, more correctly, combining proportions of sulphate of copper and bromide of potassium, and applying to the negative. Follow this, after washing, with an application of a solution of nitrate of silver, which will immediately cause a great blackening of the image.

Mr. Taylor continues then at length to tell of all the applications of the collodion process in: "Making positives, alabastrine positives, collodion transfers and photo-crayons, of failures arising from the bath. How to ascertain the strength of silver solutions, about porous and skinny collodion, and combination effects obtained from the latter. Application of collodion to lantern-slide making. Wet and dry collodion processes. Stripping collodion films. Practical directions for stripping large films." These are the titles of other chapters, and give an idea how valuable the whole is to the process worker. There are but a few copies of the 1896 *British Journal Almanac* remaining in this country, and these can be had from Messrs. E. & H. T. Anthony & Company.

LINE DRAWINGS FROM PHOTOGRAPHS.

As amateur photographer, who is also an artist, inquires how he can best make pen and ink drawings from his photographs, so that engravings can be made of them for publication in his local newspaper. It is a very simple matter, and the following concise instructions should suffice:

First make a negative of the photograph you wish to make in pen and ink enlarged to double the width the newspaper cut will be. Then sensitize a piece of Clemons matt-surface salted paper, by pouring on its coated side a little pool of a 40-grain-to-the-ounce solution of nitrate of silver, and spread this solution over the surface evenly with a tuft of cotton wool. Dry the paper quickly in a darkroom over heat, and print under the enlarged negative stronger than necessary.

Fix the print in a bath of 1 ounce of hyposulphite of soda to 6 ounces of water, taking care that no toning solution gets into this fixing bath. Wash well after fixing, then mount the print on white cardboard. Draw with waterproof india ink on this print, and when the drawing, or a portion of it, is finished, the effect can be examined by bleaching away the photographic image with the following solution painted on with a camel's-hair brush:

Water or alcohol	5 ounces.
Bichloride of mercury	1 ounce.

If the drawing is made with waterproof india ink the aqueous solution of mercury can be used, but otherwise the alcoholic solution will be needed, or the India ink will wash away. When the entire photographic print is bleached out, the drawing remains and is ready for reproduction by the zinc etching process. The above is the procedure on all the illustrated newspapers of this country to-day.

THREE-COLOR PROCESS NOTES.

It is reported that Mr. F. A. Ringler has secured a controlling interest in the "Coloritype Company, William Kurtz, President." Mr. Ringler was associated with Mr. Kurtz before in founding the Electro-Light Engraving Company. He is above all things a "hustler," and will place the Coloritype Company's business where it should be as the pioneer concern in putting into practical working shape the three-color process.

* * *

Some excellent reproductions of paintings and water-color drawings are shown by the Northwestern Engraving and Printing Company, of Chicago.

* * *

The Photochrom Company, Limited, of Detroit, Mich., announce that they are prepared, through a process which is kept a secret, "to copy from one single negative all existing natural colors successively in an indirect manner." Their work suggests somewhat the delicately colored photographs of the Japanese.

* * *

It has been suggested "that colored balsams be used in one of the combinations of the lenses used in three-color work, there being a special lens combination for each color." Stuff and nonsense! No two of the combinations would possess precisely the same focus; hence the color blocks could not possibly register.

The Boston *Daily Standard* prints advertisements in the three primary colors (red, blue, yellow) and black. This work is done on one of the greatly improved new Goss straight-line web presses, with its characteristic three "decks." The upper mechanism does the color work, with a minimum of labor or expense.—*Newspaperdom.*

* * *

True Blacks in Photo-Chromotypy.—This vexed question, about which the disagreement of those concerned in it seems the principal characteristic, simply involves the producing of a true optical black by printing the three primary colors, red, yellow and blue, over each other. Spectroscopically, it is true that such a result is possible. Practically, so far as color printing with pigments is concerned, it is, to say the least of it, not easy. The nearest approach to it has met us, says *Paper and Press*, in an example submitted by a process worker of scientific attainments and rare ability, in New York, who has undoubtedly achieved a black, but, like all such blacks, it is iridescent.

PROCESS PROGRESS.

The Chicago photo-engravers are not only up to date, but away in the future in seeking and securing business. Many New York, and even Boston, publishers send their engraving to Chicago. Candor compels the admission that the western work is equal to any to be had east. The reason for all this lies in the one word—"enterprise." The Chicago engravers are constantly striving to improve their methods, machinery and workmen. They have confidence in themselves, faith in the future, and, above all, they advertise, advertise, advertise.

* * *

Only a few years ago the writer wanted some photo-engraving done in Columbus, O., during a Grand Army encampment. There was a solitary photo-engraver in the city, T. A. Fitzgerald by name; he was also leader of a brass band. As there was much martial music demanded just at that time I was obliged to do my own photo-engraving, using Mr. Fitzgerald's apparatus. How inadequate the latter was may be gathered from the fact that the only etching "tub" he had was an ordinary wooden water pail. Recently the Terry Engraving Company, of the same city, was obliged to increase its capital stock to $20,000, and they take care of but a portion of the city's business.

* * *

It is said that the proofs of half-tone printing blocks, which in the majority of cases accompany the latter, and are sent in by the engraver as showing the possibilities of his work upon the press, are sometimes anything but examples of the actual printing qualities of the block. Generally speaking, whatever can be done by the engraver upon the hand press can be better done upon the power-press with its superior distribution

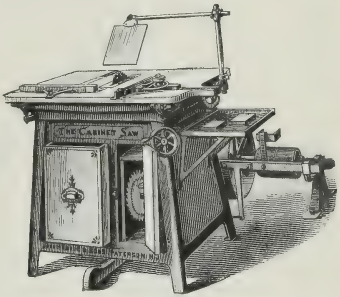
MACFARLANE ANDERSON, PHOTOGRAPHER. FROM SCHOOL OF PRACTICAL PROCESS ENGRAVING. E. & H. T. ANTHONY & CO., AGENTS, 591 BROADWAY, NEW YORK.

MECHANICAL AIDS TO PROCESS ENGRAVING.

IN considering the equipment of an engraving plant for commercial work, it frequently happens that the matter of machinery for mounting the plates is not given due consideration. This is an error, as it is in the mechanical department that time can be most readily economized, and money saved, by reducing labor to a minimum. In working with the camera and in the development and printing of negatives, matters cannot be hurried, if good results would be obtained; but this is not true of the work of preparing and mounting the plates for the printer. A skillful workman, with proper tools, makes a surprising difference in the output, and this without any falling off in quality, but, on the contrary, with vastly better results than can be gotten by the most skillful hand-work.

It is too common a custom to regard process-work from the viewpoint of the artist only, but when the process engraver enters the field of trade he must adopt commercial methods, and process work, as a paying business, can only be carried on with the aid of proper equipment.

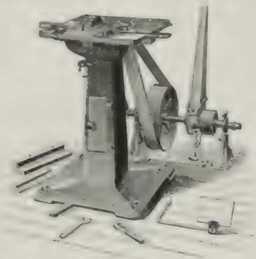
It is not the purpose of the present article to deal exhaustively with the mechanical devices used in process work, but merely to offer a few general suggestions as to the proper handling of some of the more important machines.



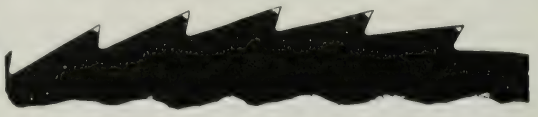
Cabinet Saw.

In the first place, the selection of the wood for blocking is of considerable importance, as, in order to secure perfect contact in printing, it must be even in height, and of sufficiently sound texture to stand the strain of the press without giving way. At the same time, it must be easy to work and free from an undue tendency to warp. For a long time, mahogany and baywood have been in very general use, these two woods possessing the necessary qualifications to a marked degree. Both are expensive, however, and the grain has a slight tendency to draw away from the nails, sometimes allowing the plates to work loose. For large blocks, say from 8 inches square upwards, mahogany is about the best wood that can be used, but for small blocks it is more economical to use a cheaper wood, such as cherry or maple. Maple is recommended by cheapness and the tenacity with which it retains its hold on the nails, but it cannot be used to advantage for large blocks, as it has a slight tendency to warp. Thoroughly dry maple, however, is perfectly safe for small blocks, and, by reason of its strength and toughness, gives most excellent results, standing perfectly the pressure of printing.

For cutting up blocking, a saw table is a necessity, and in skillful hands this machine becomes one of the most useful in the plant. The operation of a saw is simplicity itself, yet there are many details that should be carefully mastered in order to get the best results. In the first place, the blade should be selected with reference to the work to be done, and should always be kept sharp and in good condition generally. Broadly, one blade should be kept for cutting metal, and one for wood. Of course, in places where considerable sawing is done, a variety of styles and sizes should be kept for wood alone, but the sawing in an ordinary engraving establishment is hardly sufficiently elaborate to necessitate more than two good blades, although there are advantages in having an assortment.

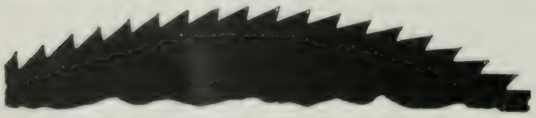

Column Saw.

For sawing wood, a blade with moderately coarse teeth, say fifty-six to a blade 8 inches in diameter, should give the best results. The shape of the tooth is of considerable importance. Many sawyers cling to the old-fashioned fleam tooth, but a tooth of this description is not well adapted to the requirements of an engraving establishment, as it is extremely difficult to keep in order. It requires constant sharpening, and a great deal more care and attention than it is ordinarily practicable to give it. For certain kinds of fine, joiners' work, fleam teeth are superior to all others, but for the engraver, a saw closely resembling a fine rip saw—that is, with teeth having considerably more hook than the fleam tooth—is much preferable. The accompanying illustration shows the best type of tooth that can be used for general sawing. It is easy to keep in order, cuts smoothly and quickly, and lasts well.


Section of Wood-Cutting Saw.

For cutting metal, the form of the tooth should be much the same as in the wood saws, but with somewhat less "hook," and very much finer. A saw blade 6 inches in diameter, for instance, should have at least six teeth per inch.

It will be observed that a much finer tooth is recommended for cutting metal than for wood. The reason for this is that the greater resistance offered by the metal demands a greater number of teeth to overcome it, thus rendering it necessary to use a blade with finer teeth than could be employed to advantage in sawing wood.


Section of Metal-Cutting Saw

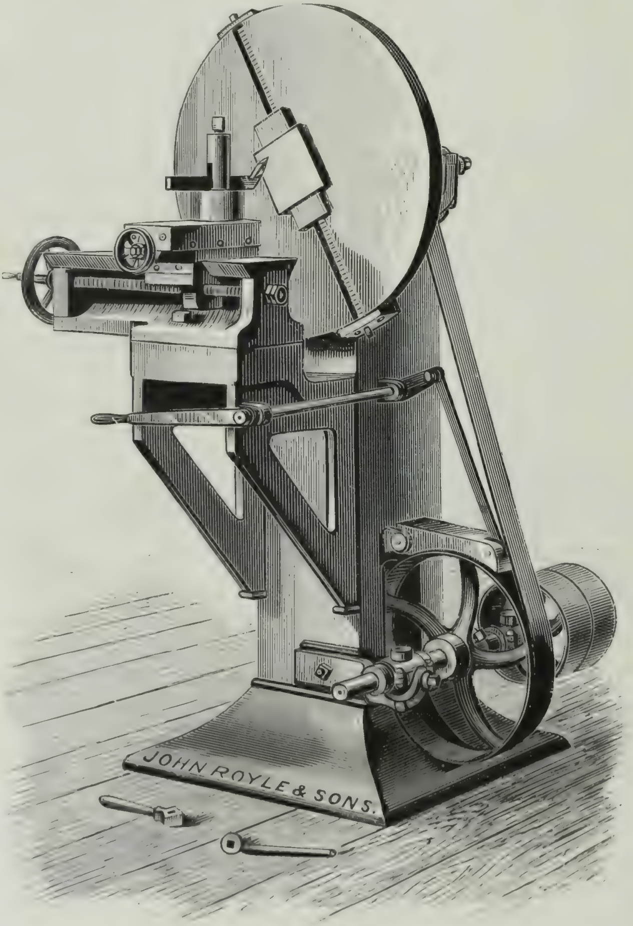
In considering the question of the size of teeth in a saw blade, it must be borne in mind that the finer the tooth, the greater the number of cutting edges there will be at work, and the smoother and quicker the cut; but, at the same time, it must not be forgotten that there is a limit below which it is not desirable to reduce the size of the teeth. As each tooth passes through the work, it cuts away and carries with it a small shaving, this shaving being tucked away between the face of the tooth and the back of the tooth immediately preceding it. Bearing this in mind, it will be apparent that, in order to cut properly, the space between the teeth should be sufficiently large to accommodate this shaving without clogging up, and, consequently, a wood saw, which is commonly used in stuff an inch or more in thickness, should have larger teeth than a metal saw, which seldom has to cut through more than a very thin plate, the shaving in one case being an inch or more in length, and in the other only a fraction of this.

Another error to be avoided is that of using too large a blade. While the larger the blade the greater the number of teeth, the increased distance from the mandrel materially lessens the rigidity of the blade, and the advantage in one direction is thus counterbalanced by the loss in another. A further objection to the use of an unnecessarily large blade is that the danger always attendant upon the use of a saw becomes greater as the projection of the saw blade above the table increases, and, as it is entirely needless to use a large blade, there is nothing gained by incurring this additional risk.

The care of the saw blade is a matter that should have close and intelligent attention. No matter how good the saw-table may be, or how skillfully the blades be selected, if they are allowed to become dull and out of round, it will be impossible to do good sawing. It is a very simple matter to true up a saw that has become unevenly worn. All that it is necessary to do is to start the saw running, and then press a small piece of emery-wheel or grindstone lightly against the face of the teeth, with a slight sidewise movement, touching them very gently and continuing the operation until all have been brought to an even height. When the saw is very badly out of round, it is often well to file the teeth after touching up with the grindstone and then grind them down again, repeating the operation until the lowest tooth has been reached and brought to an even height with the rest. Saw blades should be frequently retouched after filing, as, if this is neglected, the blade is apt to get very much out of round, necessitating considerable work to put it in condition again. Saw blades should also be sharpened frequently, and sufficient set should be kept in the teeth to insure proper clearance when cutting. Too much set, however, should be avoided, as it is apt to cause the blades to spring the teeth over so as to leave a rough cut. In sharpening, the face of the tooth should first be filed and afterwards the back of the same tooth, care being taken to use a perfectly even, steady stroke in handling the file.

The object in filing the back of the tooth last is that the burr raised by the file may be left on the face of the tooth in such shape as not to interfere with the cutting powers of the blade. If the back of the tooth be filed first, a cutting edge will be raised up above the true circumference of the blade, thus interposing an obstacle to free, clean cutting.

The general construction of the saw-table is of as much importance as the selection and care of the blades ; and it is well, in choosing this tool, to prefer one of plain and simple design, in which no attempt is made to introduce unusual or irregular motions, or to include functions not properly belonging to a saw. Tilting-tables, dropping-saws, and similar devices, while they have a certain specious appearance of convenience, are, in reality, of little or no practical value, and seriously affect the accuracy of the saw-table at the most vital points. A perfectly plain saw, made in the best possible manner, with table and mandrel accurately adjusted, is the most profitable one for the engraver and will answer every purpose. The extension of the functions of the saw, too, by the addition of parts intended to perform operations not properly within the province of such a tool, is highly objectionable, as the attempt to combine a number of more or less incongruous operations is certain to materially lessen the efficiency of the saw in its proper sphere, and to destroy its true value to the engraver.


JOHN ROYLE & SONS.

Facing-Lathe.

To print well, it is absolutely essential that the surface of the plates should be accurately type-high, and to bring this about, the wood used for blocking should be carefully turned down by means of a facing-lathe or planer. The planer and facing-lathe differ radically in construction, and each has advantages and disadvantages. The planer is a larger and more elaborate machine than the facing-lathe, and works more rapidly. It also covers a wider field, most planers being so constructed that blocking can be planed down while still in the plank, before being cut up into blocks. The form of the planer is that of a flat bed, to which the blocks are clamped, while the cutting is done by tools set in the end of a revolving, vertical spindle.

(To be continued.)

COLUMBIA.

[illegible]

ANTHONY'S

Photographic Bulletin.

EDITORS:

PROF. CHARLES F. CHANDLER, PH.D., LL.D.
FREDERICK J. HARRISON.

VOL. XXVII. JUNE, 1896. No. 6.

HAND-CAMERA WORK.

THIS is a month of great activity among outdoor photographers, and the hand camera will doubtless be largely in evidence everywhere. The bicycle offers a means of rapidly reaching places that possess pictorial interest, and the bicycle and the camera are closely related, since the one furnishes the means for the outing, and the other the excuse. The hand cameras of to-day are readily carried, being light, compact and of a shape that is the most convenient for the traveler. Some few points in connection with the camera may here be noted. The finder should be fully understood and marked, so that the relation that the image on it bears to that on the ground-glass may be accurately known. The lens should be taken care of. It is not an uncommon thing to see the front of the camera pushed back for closing, accompanied by a rough handling of the lens. The latter, being the nearest or most projecting part of the front, is seized and used as a handle to force the front of the camera to the rear of the box. In addition to the danger to the rackwork or focusing gear, there is, especially when the shutter is between the lenses and no cap is used, a danger of smearing the front lens with perspiration from the hand, or even of loosening the screws holding the lens to the front board. The camera should be opened and closed by using the device supplied for that purpose. And while on the subject of lenses, it may be well to note that these should often be examined as to their cleanliness, especially in hand cameras, which are subjected to somewhat rougher treatment than tripod boxes. Again, the diaphragm numbers should be verified. Many photographers with whom we come in contact have not the slightest knowledge of the significance of the diaphragm numbers, and, on attempting to use an ex-

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posure meter, find that they are unable to carry out the calculations, because of their ignorance on this point. In the majority of cases the value of the diaphragm, given in the directions accompanying the exposure meter, is expressed by a fraction which gives the number of times that the diameter of the diaphragm is contained in the equivalent focus of the lens. The diameter of the diaphragm is accurately measured, and the equivalent focus of the lens divided by it. For example, supposing that the equivalent focus of the lens is 12 inches, and the diameter of the diaphragm is one-half an inch, then the diaphragm number is *f*/24. Should the diaphragm be marked after the U. S., or uniform system, this may be found by squaring the number obtained after the above method and dividing by 16. Thus, in the example given above, the diaphragm *f*/24 would be marked U. S. 36; for 24 × 24 ÷ 16 = 36.

Hand cameras that are fitted with swing-back, swing-front, sliding and rising fronts, require especial care, that error be not made by the inadvertent use of either of these conveniences. It is best to make it an invariable custom to restore the camera to the normal condition before closing it up.

A tripod should, whenever possible, be taken along. While it is true that many excellent pictures have been made with the camera held in the hand, it is also true that a close examination of the ground-glass, possible only when the camera is supported on a stand, will facilitate the obtaining of truly artistic results. The hand camera is no longer an instrument for snapping here and there at moving objects. It has practically displaced its tripod older brother, and is capable of doing all that has been done with the latter. The hand cameras of to-day are simply compact and portable modifications of tripod cameras, and, whenever possible, the stand should be employed. Held in the hand, approximation only is possible; placed on a tripod, accuracy is obtained.

Exposure meters furnish a useful guide, and should be given careful consideration. Correct exposure is necessary for the production of perfect negatives, and any instrument that will help in the gauging of this important factor should not be despised. Of their efficiency we can speak from personal experience.

METACARBOL.

A MONTH or two ago we announced the discovery of a new and extremely efficient developer to which the name of metacarbol has been given. Since that time the new developer has been thoroughly tested by representative photographers in all parts of the United States, and in no single instance has it failed to come up to expectations aroused by our comments on it. Metacarbol, it should be remembered, is not a new name for an old developer, but is the name given to an entirely new product, the composition of which we ourselves are not at present familiar with. It is made by a chemist who has long experimented in this line, and its powers of development are truly marvelous. We can sympathize with the reluctance on the part of photographers to discard old and tried developers for a new comer, but in the face of statements such as are included herewith, and which it will be seen are made by photographers whose names are household words, there should be no hesitation about adopting a developer possessing so many virtues.

Mr. A. L. Bowersox, of Dayton, O., writes that he likes the results obtained with it very much, and, if the price is within his reach, he will use it entirely. Messrs. Knaffl & Brother, of Knoxville, Tenn., say, that they used it in developing a group that they are almost certain would not have come up with any other developer. The white drapery was as fine as any they have ever seen. Mr. W. H. Dunwick, of Pulaski, N. Y., writes that it is the best thing in the way of a developer that he has ever used. He made three negatives, each in the one-hundredth part of a second, and obtained fully timed results. So very enthusiastic has be become, that he writes us that we deserve the thanks of the fraternity for introducing the ideal developer. Prof. D. L. Elmendorf highly praises metacarbol as giving beautifully clean results, both for negatives and lantern slides. George Steckel, J. Ed. Rösch, F. M. Somers, C. M. Hayes, C. T. Stuart and Urlin Becker, men who stand in the foremost rank of photography, give metacarbol the very highest endorsement. Dr. H. G. Piffard, who is well known in connection with flashlight photography, and who has made photomicrography an especial study, says that with metacarbol he can obtain results hitherto unobtainable, and that he will continue to use this new developer until something better is invented. We have quoted the above comments because we feel that this new developer offers possibilities to both professional and amateur photographers that should be investigated by them.

Mr. John Strathmann, of Germantown, Ill., writing us regarding this new developer, gives the following formula :

No. 1.

Metacarbol (dissolved in 3⅓ ounces of water)	25 grains.
Sulphite of soda (15 hydrometer test)	3⅓ ounces.

No. 2.

Sodium hydrate (20 hydrometer test).

For use take—

No. 1	2 ounces.
No. 2	1 ounce.
Water	3 ounces.

For under-timed plates use more of No. 2 ; for over-timed plates use less of No. 2, or use old developer, working it as pyro is worked. Clear negatives are always obtained, there being no tendency to fog.

The experience of Mr. Strathmann coincides exactly with our own, and we are glad to find that the results with our new developer recorded by us in a previous issue of the BULLETIN are substantiated by so many prominent authorities.

OBITUARY.

VINCENT MEIGS WILCOX.

DIED MAY 9, 1896.

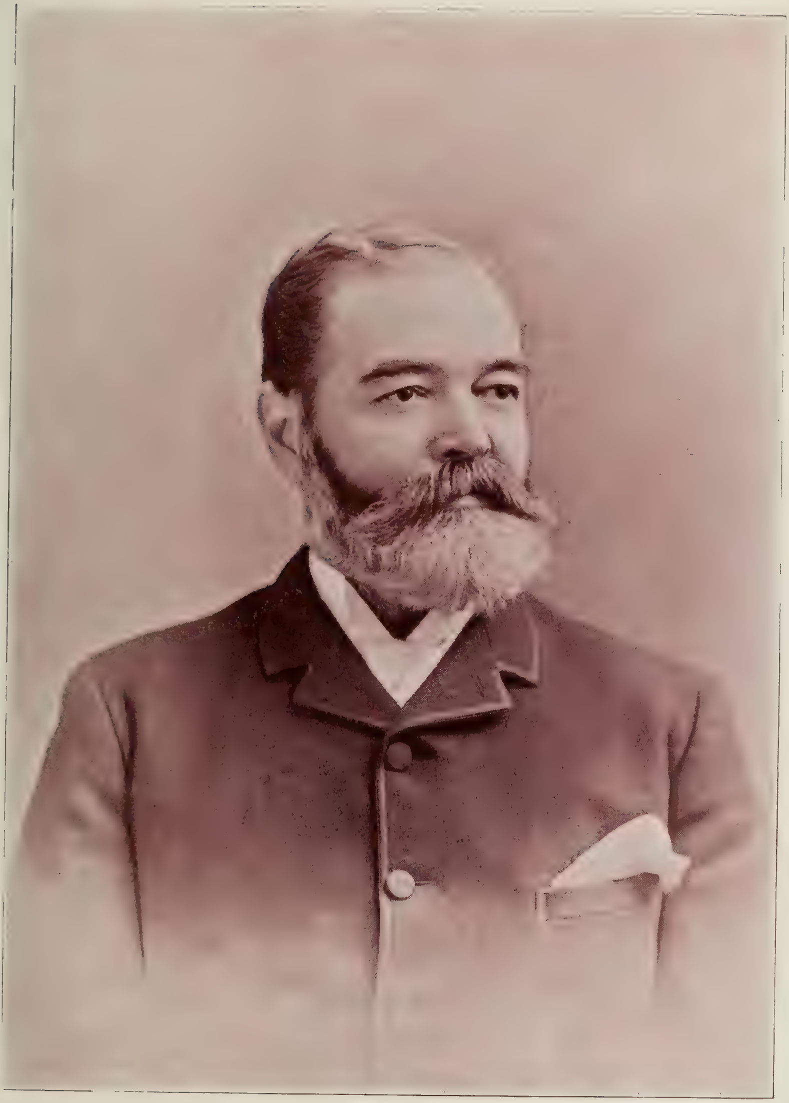
WITH deep sorrow, born of heartfelt affection, we announce the death of Col. Vincent Meigs Wilcox, President of the firm of E. & H. T. Anthony & Company. His multitude of friends received the news with sadness akin to ours. His end was sudden and unexpected, for, though he had been ailing for some months past, he was not given to making complaints, keeping his sorrows to himself, and his smiles for those with whom he came in contact. None suspected that his demise was so near at hand, for up to the day before his death he was as active as he had been for many months. He took his customary early morning ride in Central Park, reaching the office as usual at about 8.30. On Saturday morning word was received that he was not feeling very well, but the idea that the grim hand of death was stretched out toward him never entered the minds of his friends. He died at 7.30 P. M. that day from paralysis of the heart, his mind being perfectly clear to the end.

The funeral services were held on Tuesday, May 12th, at 11 A. M., at the Phillips Memorial Church, of which he was an elder. The service was fully choral, and the pastor, Mr. Bushnell, reviewed the Colonel's life in well-chosen words. Lafayette Post then took charge of the services, in accordance with the Grand Army ritual, the bugle at the conclusion sounding "taps." Friends, photographers and Grand Army men filled the church, and at the conclusion of the services took a last glance at the face of their old friend, whom they had loved and revered. The body was taken to Madison, Conn., on the same day, and interred in the family plot, the ceremonies being witnessed by a large party of sorrowing relatives and friends. Mr. Bushnell delivered a most touching address at the grave, and many who had been his boyhood companions in the little town of Madison were given an opportunity to view the body.

The Colonel was intensely patriotic, loving his country, fighting for it, and ready to lay down his life in its defence. He was born at Madison, Conn., October 17, 1828; was educated at Lee's Academy in the same place, and taught school there for several years. He moved to Scranton, Pa., engaged in business there, and organized a company to fight in defence of the Union. This company was merged into the One Hundred and Thirty-second Pennsylvania Volunteers, and Mr. Wilcox was appointed Lieutenant-Colonel. On the death of Col. Oakford, at Antietam, he was promoted to full colonelcy. Falling ill with typhoid fever, his health was so undermined that, when he offered his services again, the surgeons would not pass him, compelling him to retire, very reluctantly, from active service. He then came to New York, and engaged with the firm of E. & H. T. Anthony & Company, being admitted to the firm in 1870. Upon their incorporation he was elected Secretary, and upon the death of H. T. Anthony he was made Vice-President, becoming President and Treasurer when Mr. Edward Anthony died. He leaves a widow and two sons. The Colonel was a man of fine, commanding appearance, generous, open-handed and warm-hearted, going far out of the way to relieve suffering, and never turning his back on the needy. His kindly disposition endeared him to thousands of friends, who will keep his memory green.

FENTON M. ARMSTRONG.

WE have also to record the death of Fenton M. Armstrong, on Wednesday, May 6th, from tumor in the brain. Mr. Armstrong had been connected with the house of E. & H. T. Anthony & Company since 1888, and was highly appreciated for his untiring zeal and unswerving faithfulness. He was in his thirtieth year; active, energetic and well known to photographers in the East. His home was in New Orleans, to which city his body was taken by his brother for burial.



COLONEL VINCENT MEIGS WILCOX.

SLANT SKYLIGHTS.

OUR article on slant skylights in the May issue of the Bulletin has caused no little comment, and we take pleasure in reproducing herewith the light built in the new studio of Place & Coover. As will be noticed, it is a single slant, just as described in our last issue, and photographers will comprehend that with it every form of lighting is possible. It is free from the objections of ordinary skylights, can be easily cleaned, and is not likely to become leaky. Photographers attending the Photographers' Association of America Convention to be held this month will see such a skylight, built specially at Chautauqua to demonstrate its superiority over ordinary top and side lights. This alone is worth a trip to the Convention.

Items of Interest

THE event of the month will be the Chautauqua Convention. Its success is assured. Special trains will leave from every section of the country, and every effort will be made to make every one comfortable and happy. There is no place in the country that offers so much that is pleasurable and instructive as Chautauqua Lake. The Convention building is at the edge of the lake, and is the best building in which the association has ever convened. Instruction and pleasure will be mixed in proper proportion.

* * *

Regular attendants at the Convention will be surprised to learn that S. L. Stein, who has won so many prizes for his magnificent genre work, will not compete this year. He will be represented there by a large exhibit, of the excellence of which we have no doubt.

* * *

Photographers in the vicinity of New York, who contemplate going to Chautauqua by the special train which leaves there on Sunday, June 21st, should write us at once, for the greater the number of which we are certain, the better accommodations we will be able to obtain. Make the Bulletin train a success.

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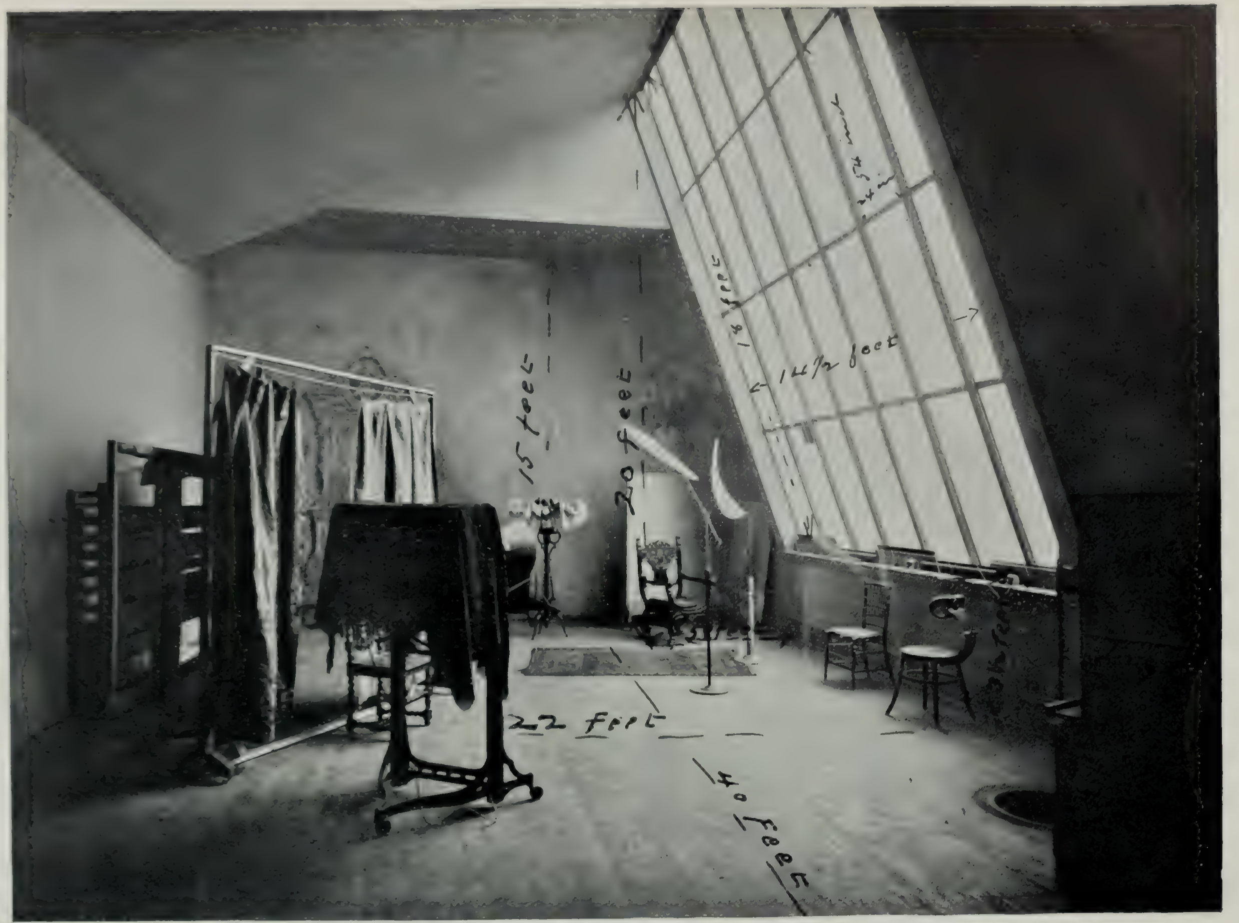
The *Courier-Journal*, of Louisville, Ky., offers valuable money prizes to amateur and professional photographers. There are three classes; two for amateurs and one for professionals. The prizes are offered to photographers in Indiana, Kentucky and the South.


15 feet
20 feet
18 feet
14 1/2 feet
24 in 3¾ inch
22 feet
40 feet

We learn that the partnership heretofore existing between Monahan & Shillcock has expired by limitation, and that Mr. H. J. Shillcock has purchased the business of Oscar Foss, and has now a complete stock house at 841 Mission street, San Francisco, Cal.

* * *

The Obrig Camera Company, who started in business in 1887, at 17 Murray street, and who for three years were at 152 Broadway, and for six years at 163 Broadway, have moved to 165 and 167 Broadway, where, with larger premises, they carry a full line of everything required by the photographer.

* * *

Mr. H. J. Smith having resigned the secretaryship of the Daguerre Camera Club, Mr. J. W. Flynn, M.D., of 116 East 81st street, has been elected to fill the position.

* * *

Prof. D. L. Elmendorf sailed on Friday, May 22d, for the West Indies, and will return by the way of Mexico. He takes his camera with him.

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The following method for obtaining the true equivalent focus of a lens is recommended by Grubb, the optician, and is given in Wall's Dictionary of Photography: "On the ground-glass of the camera draw two pencil lines about an inch from the margin at each side. Now set up the camera, preferably upon some flat surface, such as a table, upon which is spread a sheet of white paper, before a window, and focus for some distant scene, about 150 or 200 yards off, in which there is some distinct feature, such as a church spire or a tall chimney. Make the image of this fall upon one of the pencil marks on the focusing screen, and with a pencil draw a line upon the paper along the side of the camera; now bring the image of the chimney or spire upon the other line, when draw another line along the side of the camera. Remove the camera, and with a flat rule continue these lines until they cut one another, so as to form an angle, across which draw a line, so as to form a triangle. This line must be exactly the same length as the distance between the two pencil marks on the focusing screen. Find the center of the line accurately, and draw a line from this center to the apex of the triangle. This line will be the true equivalent focus of the lens." A sufficiently accurate method for all practical purposes is to focus on an object about 150 yards distant, and to measure the distance between the diaphragm and the ground-glass.

* * *

James G. Ross, in the *Year Book*, gives a hint for the treatment of leaky skylights: "In an old studio—providing the wood is in good condition, all the glass is taken out of the frames and all the old putty well scraped out from the rebate—I give two good coats of oil paint, with a day or two interval between each coat. After the last coat has dried, I proceed to well putty the rebate on top of the paint. I now lay in a sheet of glass, seeing before finally pressing down that the glass fits up closely to each sash bar. Then I rub down well, and fasten each sheet with four ¾-inch brass brads, such as shoe repairers use. After smoothening down, I paint well in between the bar and glass, giving three or four coats."

* * *

In order to ensure the perfect adhesion of labels to tin, a thin coating of shellac varnish should first be applied to the tin and allowed to nearly dry. The label will then firmly adhere.

* * *

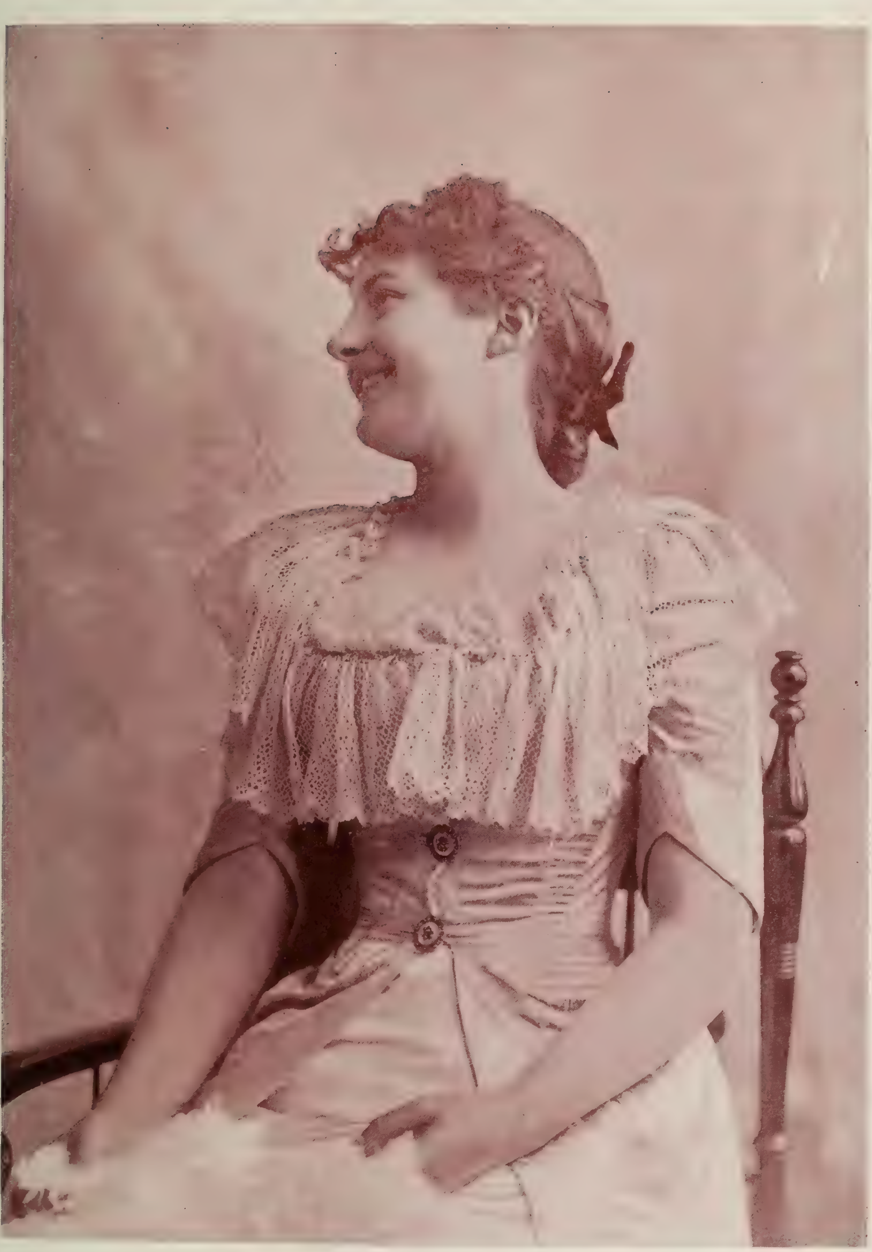
F. M. Sutcliffe, speaking at the Camera Club Conference, said : "Reflectors are, as a rule, difficult to use and unsatisfactory when used, giving an unnatural expression and an artificial, untruthful lighting. It was much better than trying to throw the light into the shadows by reflectors to soften the direct light by interposing a screen of tissue paper between the skylight and the sitter. This not only softened the light, but also diffused it and gave an effect more like that of open air —an effect often the most pleasing and harmonious of all. Everything should be subservient to the head and face, yet far too often the hands, collar and cuffs were the things you first saw. Something could be done by lighting or, rather, shading. Sunning down the prints was a tedious business ; chemical reduction was risky ; rubbing down the film was to be preferred. Too much, by far, is often left to and expected of the retoucher, who not only knows nothing of the sitter, but often knows little of his business, and thinks it is done when there is nothing left that he can remove. In the good time that we all hope is coming, it will be enough to have one sitter a day—to have time to study him and do the work lovingly, carefully and thoroughly. Prices will then enable one to be independent of size, cost of material, etc., the one end and aim being really artistic portraiture."

* * *

C. H. Bothamley believes that the gold-blue tone obtained with hypo and lead baths, and which has heretofore been ascribed to sulphurization, is due to the formation of the silver subsulphide. This is an unstable salt, and, like most of all the other subsalts of silver, easily passes into the common silver sulphide. The subsulphide is purple. brown in color, while the sulphide is light in color, tending to a yellow. Hence it is very probable, with sulphur toning in general, those prints which have retained their rich color so much like gold-toned prints are still composed of the subsulphide, but those that are of the too familiar, stale-cheese color have passed from subsulphide to sulphide state.

* * *

Capt. W. Baker says that photographing clouds may be done in several ways : 1. By using a black mirror at a proper angle to the lens axis the skylight is polarized, and that from the clouds is not so affected. Thus special degrees of contrast may be obtained. 2. By using (yellow) screens with or without orthochromatic plates. 3. By interposing a fine transparent sheet of mica behind the lens.



Negative on Climax Plate by
Charles W. Hearn, Boston, Mass.

Half-tone and Printing at the
School of Practical Process Engraving

A PRACTICAL ENLARGING PROCESS FOR THE AMATEUR AND PROFESSIONAL.

FOR many years, at convenient moments, I have experimented to ascertain the very best method to be used for enlarging negatives. There are many times when, in the case of friends passing away, we find only some small pictures, the result of random "snap shot," out-of-door photographs, which of themselves are not satisfactory. When the negatives of such pictures exist, a result can be obtained by the process I will describe, which is surprising even to an expert.

The method hitherto in use, when the negative proved available, was to print a glass positive by superposition or in contact with the negative, and from the resulting positive—which, of course, is the size of the original negative—make an enlarged negative through a camera. This has always been against my conviction, as it seemed as if the grain, the retouching and all the imperfections and striæ of the glass were proportionately enlarged and reproduced without remedy. But as it was the generally accepted method in use abroad, and especially in the large (carbon) establishments in London, it was accepted.

Of late I reversed the operation by first making a full-timed positive the exact size desired for the enlarged negative. The amendments, improvements and changes that can, at this stage, be made are remarkable. Upon the perfection of this positive and the work thereon depends the success in the final result. Let this positive be very carefully retouched and improved, as already suggested. When done, place it in a printing frame of course with the glass side out, and in perfect contact with a dry plate. Back plate with black cloth or felt to prevent halation, and expose it at the distance of, say, 4 feet from a 6-foot burner two or three seconds, depending upon the vigor and strength of the positive. I usually expose and develop a small (4 x 5) plate as a test of the proper time. If all is carefully done, the resulting negative will compare favorably with a negative made from life.

When a small negative, especially a portrait, is made with the intention of making an enlarged negative, the sitter should be well away from the camera, the latter being as large a lens as is practicable. For instance, if one possesses a "3A" Dallmeyer, the ordinary cabinet negative will be nearer to correct perspective (there is "perspective" in portraiture) and proportion than if taken with a "3B" or smaller lens.

An "18 x 22" negative, recently made in the above manner from a cabinet of Mrs. Maud Ballington Booth, compares very favorably in all respects with any negative in my establishment taken direct from life. That the perspective and proportion is better and the distortion less goes without saying; but "that is another story," to which I hope soon to give attention (Distortion in Portraiture).

Finally, let all the steps in the process be carefully made, even to the dusting off and cleaning the uncoated sides of the original negative. Let the positive be somewhat vigorous, but full of detail and modeling. When dry, there is a fine opportunity for the tasteful, careful retoucher to not only remove imperfections, but to much enhance many details all through the picture. Lights may be accentuated and shadows darkened.

GEORGE G. ROCKWOOD.

THE SOLARIZATION OF DRY PLATES.

LOOKING at the reversed side of a number of dry-plate negatives it will be found that on some of them a positive can be readily seen if the plate is held against a black ground. With others this is not the case.

While both kinds of negatives are of uniformly black coloration on the film side, the former possess on the glass side a white coloration, while the latter are black on that side. This white coloration is caused by bromide of silver, which remained undissolved during fixing. It is located between the black silver and the glass.

The negatives containing bromide of silver are those of long exposure. Under-exposed plates are free from this. Normally-exposed plates have it only in the darkest parts. In landscapes, it generally appears in the sky. The plate has, therefore, not been fixed at those parts. The bromide of silver would not have disappeared, even under prolonged action of the hyposulphite of soda.

The appearance can be observed on negatives developed with hydroquinone or amidol as well as on those developed with pyro. The tanning of the gelatine is, therefore, not the cause.

I have shown before (*Photo Archiv*, 1896, page 10) that a dry plate, upon which a metallic fog formed during development, will fix very badly, because bromide of silver will always remain in the same. Only after removal of the red fog by means of bromide of copper will it disappear entirely in the treatment with hyposulphite of soda. On foggy plates the thin silver layer retards therefore the fixing. It is very probable that the above-described appearance has the same cause; that, therefore, the silver, reduced by light and developer, will not let the hyposulphite of soda penetrate.

This explanation is supported by the fact that on the boundary of a very dark and a very light part of the negative the bromide of silver will disappear during fixing, about a millimeter underneath the dark part. The positive, looked at from the reversed side, is then smaller than the negative. The hyposulphite of soda has penetrated here, not from above, but from the sides.

The observation that, under the circumstances mentioned, bromide of silver can remain in a negative, is by itself not of particular importance. It promotes, of course, our knowledge of the constitution of the finished negative, as we have to take into consideration the undissolved silver salt aside from the metal, the gelatine and the oxidation products of the developer. Much more important are the conclusions derived herefrom regarding the physical part of development.

If bromide of silver remains under the metal, the former was not reduced by the developer; the picture reaches not always from the surface to the glass, and particularly not in the strongly exposed parts, of which this should be expected mostly.

It is, therefore, shown, without doubt, that the developer also does not penetrate this depth at the strongly exposed parts, just as later on the hyposulphite of soda fails to do. At a shorter exposure the developer will penetrate, however, the whole film and reduce the bromide of silver to the glass.

This explains an appearance, for which heretofore purely chemical causes were ordinarily accepted—the solarization of dry plates.

If part of a plate was strongly over-exposed, the reduction remains limited to the uppermost coating. The coating of metallic silver is here very thin. But it retards completely the further penetration of the developer. The reduction on the surface was too rapid. On the other parts which were less strongly exposed, the reduction will proceed slower, and the developer has, meanwhile, time to penetrate to the parts underneath. The latter become, therefore, more powerful, and are also free from bromide of silver. The rapidity of reduction is, therefore, the only condition. It is not necessary to presume that at longer exposure a solid film, and at shorter exposure, on the contrary, a more porous film, will form. A strong developer furnishes, with over-exposed plates, flatter pictures than a weak developer. An addition of bromide of potassium, which retards the reduction, furnishes, therefore, more dense pictures. But the explanation is also possible, that the bromide of potassium will make the upper film less capable of reduction, thus enabling the deeper penetration of the developer by a slower formation of the silver film. The solarization will be increased by the addition of fixing soda, thiosinamin, or of too much ammonia.

This theory of solarization of the developing dry plates cannot be proven nor contradicted by the experiment that the plate is exposed from the reversed side, or by stripping the gelatine film from the glass before developing. In the former case the protecting silver film will likewise form on the surface after over-exposure, the light having penetrated so far. After fixing, the bromide of silver can distinctly be seen from the glass side. If the film has been stripped, the protecting skin will form on both sides, and, between the same, bromide of silver (or, perhaps, to be more exact, bromate of silver) will remain behind.

If a negative is examined from the reversed side during its development, no picture will be seen sometimes; at other times a negative, and even a positive, can be seen.

The plates of different manufacture have also different effects. On chloride of silver gelatine plates a negative can more rapidly be seen on the reversed side than on the highly sensitive bromide of silver plates. These differences are partly caused by the active rays penetrating deeper into the finer grained chloride of silver gelatine than into the bromide of silver gelatine of coarser grain. However, I will not enter here any further into the causes of these differences, but I shall describe only the behavior of one kind of plate—a normally sensitive bromide of silver gelatine plate. These observations furnish an important support to my new solarization theory.

A normally exposed plate shows, after some time, a negative on the reversed side (to be short, I use the expression it penetrates). This negative intensifies at further development.

An under-exposed plate penetrates likewise as a negative, if sufficient light penetrated that a blackening can be seen from the glass side; otherwise this will remain uncolored.

A strongly over-exposed plate penetrates, after longer development, strongly positive. Sometimes a weak negative precedes this positive. But this disappears again soon, the reversed side being uniformly colored. Then a positive will follow.

Further details I will reserve for a future article.

R. Ed. Liesegang,
Translated by Hy. Dietrich.

PHOTOGRAPHY OF COLOR.*

It would be presumptuous on my part to expect to present to you this evening much, if anything, entirely new pertaining to a subject to which so much careful study has been given for more than a quarter of a century, the fundamental principles of which, in fact, have been known ever since photography itself was discovered. It only remains for us to bring the many delicate and intricate details to a higher degree of perfection and to put them more completely under our control.

In order that we may proceed intelligently with the problems before us, I will briefly state the theory now held of the nature of light. The boldest assumption ever made by the scientist is that of the existence of an all-pervading ether, a nothingness, yet having such properties as perfect elasticity, no weight, continuity, filling all space not occupied by matter, etc. Time will not permit of the discussion of the nature of a scientific theory. Suffice it to say, that no theory is of any value whatever which positively fails in a single test to which it may be put. In this, as in most cases, the proof is entirely negative—it cannot be demonstrated that such an ether does not exist, while, on the other hand, it enables us to account for a large number of phenomena, otherwise unexplained. So much, then, for the validity of the theory. The ether may be defined as that compilation of properties necessary for the explanation of the phenomena of light, electricity and radiant heat.

The undulatory theory assumes that energy may be transformed into that state in which it may be propagated by the ether at the enormous velocity of, approximately, 186,000 miles per second, in the shape of waves, exceedingly small, but of definite dimensions. These waves are of the transverse kind, *i. e.*, similar to those on the surface of water, in which the vibratory, or up and down, motion is crosswise to the onward or propagatory motion. At present our knowledge of this wave motion is limited to a range of about eight and a half octaves, to use a musical term, an octave meaning the doubling of the number of vibrations. The eye is affected by less than one octave of these ether vibrations, the longest that can be perceived being about one-thirty-eighth thousandths of an inch in length, and the shortest about one-fifty-nine thousandths of an inch. Light, then, is defined as that range of ether vibrations whose wave-lengths lie between these limits. I shall presently show, with the lantern, how the waves of different lengths affect the eye. For the present, it will be sufficient, but important, to note the well-known fact that the longest of these waves produce the sensation of red, the shortest, of violet, while those of medium length produce that of green. Now, give your imagination full play for a few minutes, and picture every source of light, from this lamp to the blazing sun itself, as sending forth along straight lines in all directions a subtle, palpitating set of waves, speeding on through space at a rate great enough to carry them more than seven times around the earth in a single second, and you have the theory in operation before you.

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* Paper read before the Society of Amateur Photographers of New York. Reprinted from the Society's Journal.

Perchance a few of these rays enter the pupil of your eye and strike into that sensitive chemical of the retina, called purpurine, in which the optic nerve terminates. Is it any wonder that the delicate molecules of this substance are shattered, and its rich purple bleached and faded, and that the nerve terminals in the midst of this disturbance recognize that something has happened? The mind simply says, "I see." This is the theory of vision. We are interested still further with this purpurine. Everyone knows that the pupil of the eye dilates or contracts accordingly as the intensity of the light is less or greater. But the pupil is not the only regulator in this matter, as was formerly supposed, nor could it be, for the eye accommodates itself to a change of intensity, amounting often to more than a hundredfold, while the contraction of the pupil to, say, one-third of its former diameter (and that amount would be phenomenal), would compensate for less than a tenfold increase in intensity. It is now known that the amount of purpurine infused into the retina is greater as the quantity of light is smaller; in other words, the sensitiveness of the eye is made by this means to vary inversely as the quantity of light admitted, approximately.

Thus the eye is a perfect camera, not only in its mechanical construction, but in its chemical action also, and is far more convenient in that the sensitive film is not mounted on a glass plate or on a roll of celluloid; but the new sensitive material is constantly supplied and the old withdrawn without interrupting the operation of sight.

The theory of the vision of color assumes that there are three kinds of purpurine. One is susceptible to the action of the long waves of light, and, consequently, gives the sensation of red; this may be called the red-perceiving variety of purpurine. Another kind is affected by the short waves and gives the sensation of violet, and the third, by those of medium length, and produces the sensation of green; and these may be called the violet-perceiving and the green-perceiving varieties respectively. Other color sensations are produced when two of these varieties are acted on simultaneously; for example, the perception of yellow results when both the red and the green varieties are affected, and when all three are acted on, in the proper relative degree, the sensation of white is produced. One of the strongest arguments in favor of this theory is found in cases of color blindness, in nearly all of which the result is just what must happen if the red-perceiving purpurine is absent; in a few cases the green-perceiving variety is wanting, either alone or along with the red. This is, practically, Young's theory of color vision, but with this modification, that instead of his triple nerve terminals of different lengths and their mode of operation, which was simply mechanical, we have a purely chemical process, which is so analogous to photographic action as to demand careful consideration. Instead of assuming the actual existence of different varieties of purpurine, it would probably be more correct to attribute the several color sensations to different characteristic modes of chemical decomposition of the purpurine by the various rates of etheric vibration.

The question as to what the primary colors are suggests itself in this connection. We will define them as that fewest number of colors with which all possible varieties of color may be produced; and these are red, green and violet, and not, as is usually stated, red, yellow and blue, notwithstanding the necessity of using red, yellow and blue pigments to produce the whole range of color in printing or painting. Red, yellow and blue ought not, however, to be called the primary colors, for neither the yellow nor the blue color of a pigment is a simple color, but rather, a combination of two colors, in consequence of which, green results when yellow and blue pigments are mixed or superposed.

I would urge the adoption of such a definition of primary colors as will avoid the necessity, and exclude the possibility, of there being two sets of primary colors; one set for colored light, as such, and another for light from colored pigments, for that is both confusing and unscientific. Since the spectroscope shows the colors from yellow and blue pigments, to be complex, they cannot be considered primaries. The definition, then, should read: The primary colors are that fewest number of pure spectral colors, which, singly, and in varying combination with each other (or by their total absence), will produce the entire range of color vision. Spectral red, green and violet are these colors, and there can be no other primaries. A pure spectral color, physiologically considered, is the color sensation produced by a single limited section of the natural spectrum: for example, roughly speaking, the section from D to E is spectral yellow. In a physical sense, a spectral color is a particular continuous range of wave lengths, whose limits are largely determined by its physiological effect. On the other hand, a complex color, as, for example, complex yellow, results when spectral red and spectral green are combined, and this may be either with or without spectral yellow.

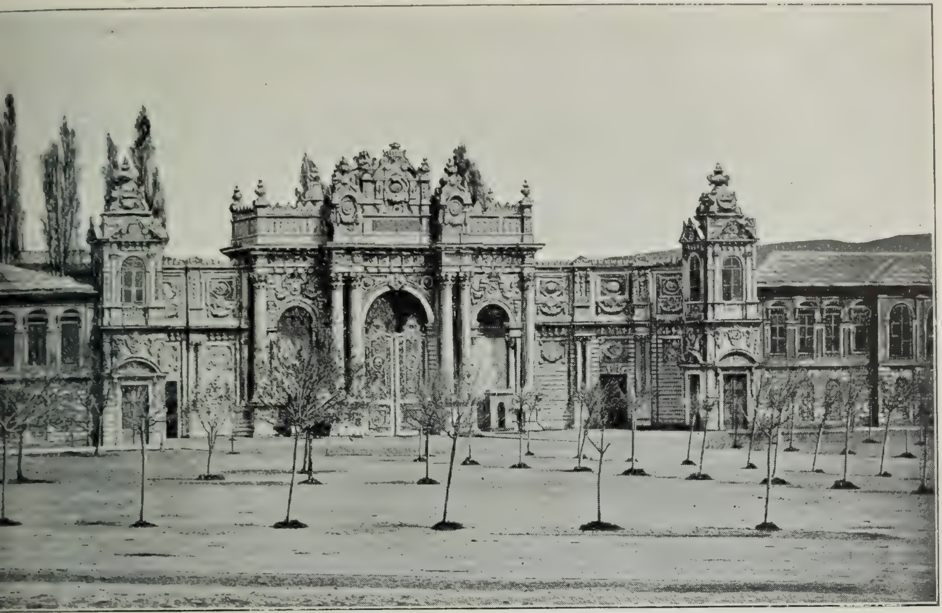
The eye cannot distinguish between spectral and complex colors, but the spectroscope at once reveals their true nature.

The explanation of the color of an object, it will be remembered is, that when white light falls upon a body, some of the waves, the longer or shorter, or medium ones, singly or combined, are absorbed and cease to exist as light, while the rest are reflected, and, being of particular lengths, produce a corresponding color sensation. The color, then, is not possessed by the object itself, but results from its power to absorb a part, and reflect the remainder of the white light which strikes it. If all the waves are reflected, the object is said to be white, as a piece of white paper or cloth; if none are reflected, but all absorbed, the term black is used to designate the absence of reflected light. A perfectly black hat, hung against a perfectly black wall, would be no more visible in broad daylight than in blackest night; but, as it is not possible to find a material which will reflect absolutely no light, such a result can only be approximated in the experiment.

In the case of transparent colored bodies, a little further explanation is necessary. A piece of clear glass transmits the waves of light practically undisturbed, so far as their length is concerned, while a piece of red glass permits only the long waves to pass through it, at the same time absorbing the others; a green glass transmits only those of medium length, while only the short waves get through a violet glass. Of course, it is understood, these colors must be pure and saturated, conditions that can only be approximated in practice. Often the waves that do not penetrate are reflected from the surface on which they fall instead of being absorbed, and, thus, a large part of the set of waves is separated into two divisions, and the color effect produced by one division is said to be complementary to that produced by the other, that is, the resulting colors are complementary.

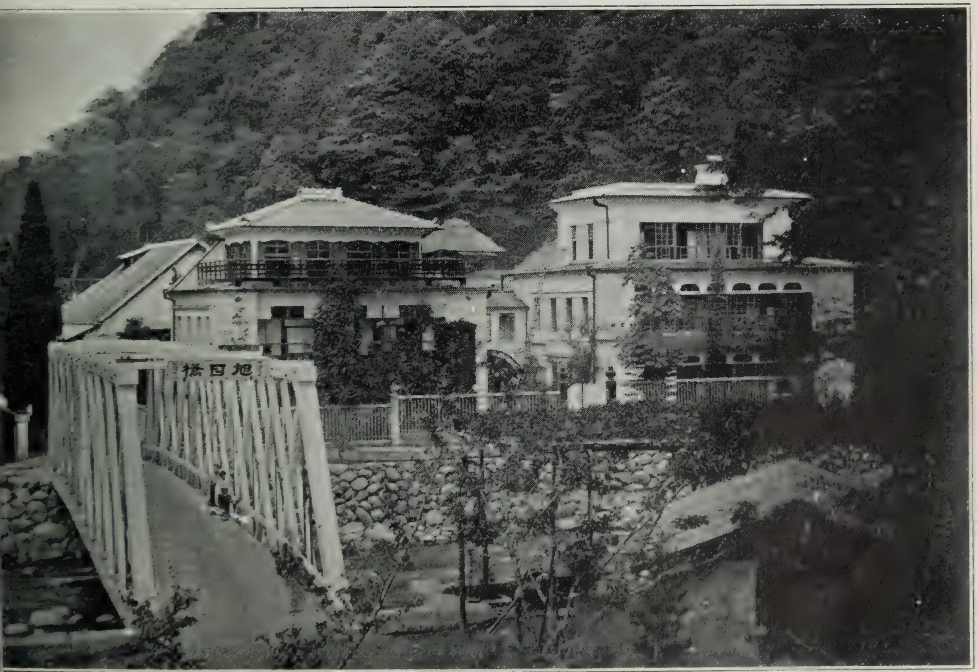
It is evident, from this, that two complementary colors combined will produce white light, since, together, they contain the whole range of visible waves. An illustration of this kind of separation of light, is found in common red ink. If a few drops are poured on a black surface, the ink will appear green; or if allowed to dry on a pen or on the stopper of the bottle they are colored green. The inks used in printing colored pictures, and many of the pigments used by the artist, are transparent materials, that is, a high degree of transparency is one of their most essential qualities, and when these are spread on a white surface, the result is practically the same as laying on the surface a very thin piece of glass having the same color. In both cases a particular part of the light only is transmitted to the white surface beneath, which reflects it to be re-transmitted and carried to the eye, so that the surface appears to have the color of the transmitted light.

Let us assume, for the present, what will be proven later, that blue glass or blue pigment is blue because it transmits green and violet light, either with or without spectral blue, and that yellow glass or yellow pigment is yellow because it transmits green and red light, either with or without spectral yellow. Now, if a layer of blue pigment be superposed on a layer of yellow, but one color will be able to pass through both, and that will be the one transmitted by them in common, that is the green. Consequently, the production of green by the combination of yellow and blue pigments is not caused by a chemical action, but is a purely physical



GOLDEN GATE OF THE DOLMA BAGHDJE IMPERIAL PALACE, CONSTANTINOPLE.

Half-Tone on zinc by TH. VAFIADIS.



A SUMMER RESORT, HAKONE, JAPAN.

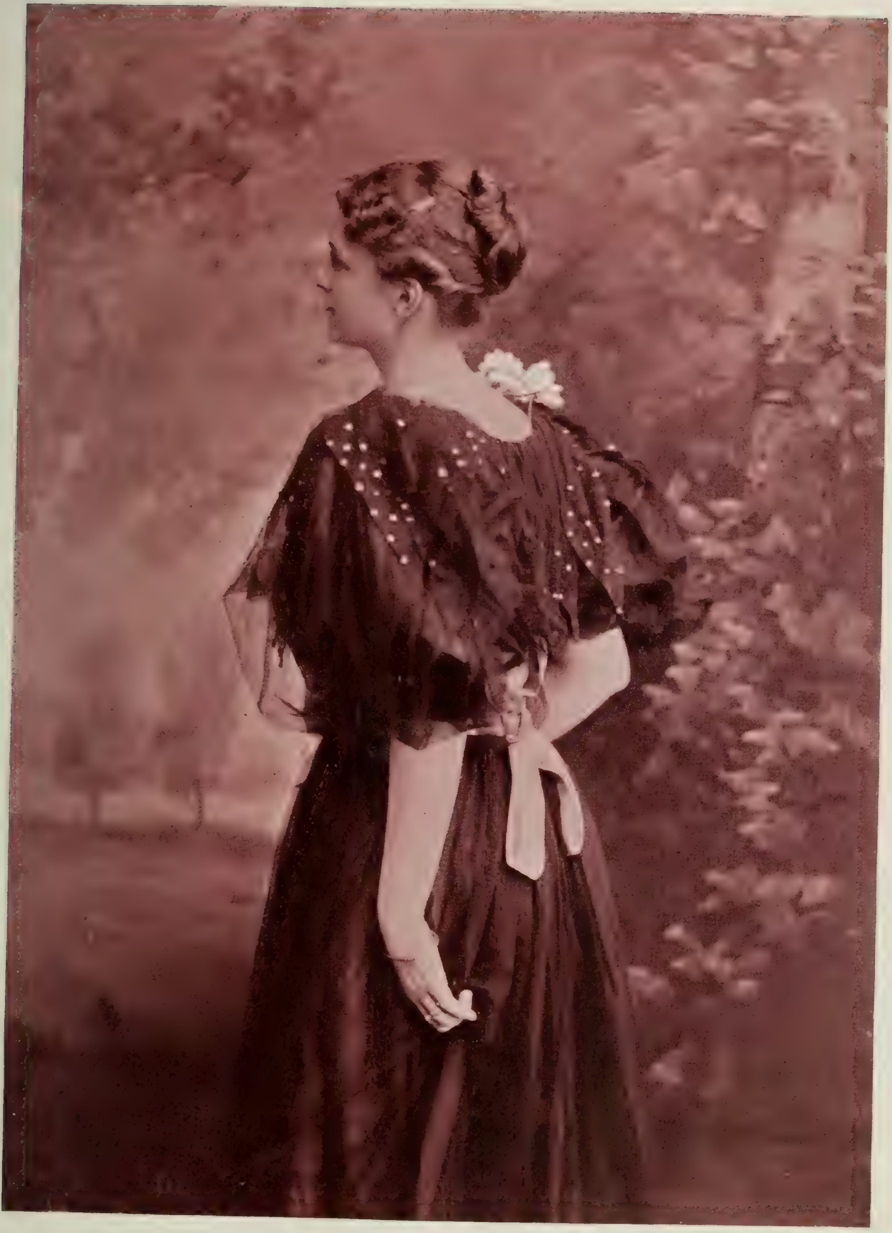
Half-Tone on copper by I. TANAKA.

result. Neither does it argue, in the least, that yellow and blue should be considered primary colors. In the same way orange is formed by the combination of yellow and red, and purple from blue and red ; and, furthermore, it is evident that if red pigment is superposed with yellow and blue, all the light will be absorbed and the surface becomes black.

We are now ready for the explanation of the method of making a colored picture by what has been termed the tri-color process. Let it be understood that the problem of colored photography cannot be admitted into our discussion this evening. It remains, up to the present, practically unsolved, and bids fair to baffle the scientist for some time to come, notwithstanding it has been the fondest dream of the photographer for more than half a century to reproduce Nature in all her varied hues. The photography of color, however, is a very different thing, and is quite practical. It constitutes the first, and, perhaps, the most important. part of the tri-color process. I may assume that all who are associated with this Society are familiar with the operations of making an ordinary photograph, and have carefully studied that all-important thing, a negative, which is simply a film rendered opaque in some parts, quite transparent in others, and having all degrees of sub-transparency ranging between. This negative is a minature reproduction, perfect in form, but without any of the color of the original.

Now, for our present purpose, we will group all the colors in any subject we may wish to make a picture of, into five classes, viz., the blacks, reds, yellows, blues and whites. It is understood that each of these so-called classes is supposed to contain what would correspond to one of the effects of colored pigment ingredients if the original had been produced by the use of red, yellow and blue pigments, *i. e.*, each class contains a particular color, not only when it is pure and uncombined (in which condition it might be absent altogether), but also when combined with one or both the others, in large or small quantity, and no matter how thoroughly disguised. A careful examination of a common negative shows that the transparent parts correspond to the blacks, reds, and yellows in the original, while the opaque parts correspond to the blues and whites ; the whites because of the blue in them. This means, then, that only the blue, or more properly, the blue-violet, light produces the opacity in a common negative. When a black and white monochrome, or ordinary photograph, is made, its light and dark regions are just the reverse of those in the negative, so that the light parts of the photograph represent the whites and blues in the original, while the dark parts represent the yellows, reds and blacks. This monochromatic representation of color is strongly objected to by the artist, and with good reason, as I will show a little later. Results very different from that obtained on an ordinary plate, with the usual methods of exposure and development, may, however, be had under special conditions. Most important among these are the so-called sensitization of the plate and the filtration of the light. Notwithstanding the interesting results of Mr. Ives' experiments on the sensitization of the ordinary plate, published some time since, which seem to show that with proper filtration of light photographic action may be obtained from any part of the spectrum, yet, in practice, it is necessary to make use of sensitization. The methods of sensitization and the results it produces may be clearly stated, but not so when it comes to explaining what the nature of the effect produced on the plate really is.

The violet end of the spectrum acts, generally, as a reducing agent, while, on the other hand, the red end often shows a tendency to act as an oxidizing agent under ordinary conditions. However this may be, one of the essential properties of a sensitizer is chemical in its nature, and such as to enable it to appropriate to itself and dispose of the oxidizing tendency of the red end of the spectrum. Another very important, if not indispensable, property is physical in its nature, the so-called optical property, *i. e.*, to be most effectual the sensitizer should absorb only that color, the photographic effect of which is desired, the remainder being reflected, which means that the color of the sensitizer is complementary to the color to which the plate is to be rendered sensitive ; thus cyanine and malachite green sensitize to



NEGATIVE ON CLIMAX PLATE
BY BOWERSOX, DAYTON, OHIO.

HALF-TONE AND PRINTING AT THE
SCHOOL OF PRACTICAL PROCESS ENGRAVING.

red, and erythrosine and methyl violet sensitize to yellow, etc. When the kind, extent and degree of sensitization are determined, the problem of filtration is quite simple.

The filter must be chosen with reference to the condition of sensitiveness. Many experimenters make a serious mistake at this point by assuming that because the end in view is to obtain three photographs, one of the red, another of the green, and another of the violet-color ingredient (in the case of a lantern picture), they must needs use ray filters of corresponding colors. Such filters would, perhaps, be the correct ones to use if there could be produced in the plate a perfectly uniform and continuous sensitiveness throughout the entire visible spectrum. It is doubtful, however, if such a condition is at all desirable. Various sensitizers may be made to produce maximum sensitiveness in one or more particular regions of the spectrum without, as a rule, appreciably diminishing any sensitiveness previously possessed by the plate. If, then, sensitiveness is produced in regions where it is desired to have it, there will generally be one or more other regions also sensitive, and it is the function of the filter to cut out the one or more other colors to which the plate is sensitive, but which it is desired should not produce an effect. For example, if a plate is rendered sensitive to green, it will still be sensitive to blue and violet, and in order that it may photograph green only, the other two colors must be cut off ; consequently any filter which will transmit green, but not blue and violet, will do equally well ; *i. e.*, it may be a yellowish green, or a yellow, or even an orange, and the result will be the same. Or, again, if a plate is rendered sensitive to yellow, it will retain its blue-violet sensitiveness, which makes it necessary to cut off the blue and violet if the yellow is to be retained alone, and, as before, a yellow, or orange, or orange-red filter, will give approximately the same results. Cyanine produces sensitiveness in regions of the yellow and orange, and well into the red, so that with the natural blue-violet sensitiveness all the spectrum, except the green region, is sensitive ; consequently it is not strange that almost any red filter, which does not transmit blue and violet, will give about the same result. This red filter may transmit much or little or no green, without modifying the result in the least, and yet the difference in appearance to the eye resulting from the transmission of more or less or no green is exceedingly great. No other explanation than this is necessary. Nevertheless, some of the best-known experimenters pronounce it paradoxical that red filters of different quality give practically the same results. The question is not so much what shall the ray filter admit as what shall the ray filter exclude? Of course, it must admit the particular color whose effect it is desired to obtain. It follows from this that with the usual methods of sensitization, no matter what the result desired, there is positively no need whatever of a green filter.

The first step in the tri-color process consists in making three negatives of the subject, which are exactly alike in form, but each different from the others in that its opacity represents different kinds of color. They are similar in this respect (which is true of all negatives) that all are transparent in regions corresponding to black in the original, and all opaque in regions corresponding to white ; but here the likeness ends ; one must be further transparent in regions corresponding to red, another to those corresponding to yellow, and the third in those corresponding to blue. To accomplish this, various kinds of sensitization and filtration are necessary. The fundamental conditions to be considered are these : first, black will always be represented in a negative by transparency, and white always by opacity ; and, second, the superposition of red, yellow and blue transparent pigments on white paper produces black, while the absence of all three will, of course, leave the paper white ; therefore, whatever be the process of printing, this common or black—representing transparency of the three negatives must have corresponding to it the three pigment impressions ; and further, the common, or white, representing opacity, must have corresponding to it none of the three pigments.

The transparency, then, of each negative represents the extent and degree of distribution of a particular pigment. The red-printing negative is transparent for black and red, but opaque for yellow, blue and white ; the yellow-printing negative is transparent for black and yellow, but opaque for red, blue and white ; and the blue-printing negative is transparent for black and blue, but opaque for red, yellow and white. And, since opacity results from the action of light, while transparency means the absence of such action, it follows that each negative is produced by the action of white light minus that particular color which is to be printed by it. In other words, the color of the light which produces each negative is complementary to the color of the pigment printed by the plate made from it. An ordinary plate will not serve to make one of the negatives. Such a plate, however, is almost invariably used, and this means the underlaying of all the red pigment with the yellow. An attempt to correct this error is made by using a red ink containing more or less blue to neutralize the warm effect caused by the yellow, but much of the luminosity and many of the delicate effects, especially in the tints, are lost by this compromise. The artist's severe criticism of the process, with regard to this point, is certainly most just. This arrangement makes it absolutely necessary that the yellow should be printed first, and the aim seems to be to bury it just as deep as possible. Such should not be the case, but rather, provided the pigments are equally pure and transparent, any order of superposition ought to give the same result. But there will be no such fault if the third plate is properly sensitized and exposed.

A very interesting fact in connection with this subject seems to have been quite overlooked. In producing colored pictures in pigments or by light in the lantern, distinct, visible colors are substituted for various regions of the spectrum with reference to correspondence of color, either when separate or when in combination ; consequently the ultra-violet light must be taken into account, so that its very marked chemical action may not result in the introduction of one or more of the colors in places and proportions wholly foreign to the original. This is of especial importance in making a colored lantern picture, and must be provided against by barring out the ultra-violet action.

The mechanical part of the process consists in preparing a plate from each of these three negatives, from which an impression in ink may be transferred to paper. Red, yellow and blue ink is then applied to the respective plates and the three impressions are successively superposed on white paper, care being taken to have them register exactly.

Of the many perplexing problems which present themselves, when it comes to the printing operation we can say nothing here. To print from gelatine seems to be the easiest and most satisfactory method for experiment, although the difficulty in controlling the quantity of ink is a very serious one. If the right materials are used, and the work is properly done, the printed picture thus produced will be a very exact reproduction of the original in color. In actual practice there are a number of difficulties, as yet not entirely mastered, in consequence of which the majority of colored pictures made in this way only approximate to the desired result. But this may, in all justice, be said of it : that the theory is sound, and that it is the only practical method so far discovered by which a permanent colored picture can be produced by the aid of the camera. Photography is made, not only to select the proper colors, but to distribute them correctly as well. A simple illustration may serve to clear up some of the most difficult parts of the process. Let it be required to make a colored picture of a bouquet of three flowers, one red, one yellow and one blue, with a green leaf or two, all tied up with a white ribbon and arranged with a black background ; not a very artistic group, I must admit, but it best serves our purpose. The three negatives are taken and the printing plates prepared, each of which is rolled with its proper ink. The picture is to be made on white paper, and we understand that red, yellow and blue pigments, all three combined, produce black. What is each plate to do? It is evident that all three plates must spread ink over that part of the paper which is to represent the background, for that is black. Again, none of them must leave any ink on the space where the white ribbon belongs in the picture. The space for the red flower must receive red ink only, and so with the yellow and blue flower spaces, each of which must be printed with the one color only, and as for the green leaf space, that must receive both yellow and blue ink, and the resulting color will be green. That is, each plate has certain portions of its surface blank, so that it does not obtrude its color where it does not belong.

The production of a colored picture with the lantern, by the use of three slides, is based on the same principles ; but there are certain important differences in the negatives. That the differences are very considerable is not difficult to see, notwithstanding which, some eminent experimenters have come to the remarkable conclusion that a set of negatives which are correct for a colored print, are equally good for a lantern picture, and *vice versa*. This seems strange, for it may easily be shown that not a single negative in the print set is duplicated in the set from which the lantern slides are made. To make this set, an ordinary plate may be used for one negative, and it is exposed with a filter which cuts off the ultra-violet rays only. It corresponds very closely to the ordinary negative, but the ultra-violet action must be suppressed, else violet light will be substituted for what was invisible in the original, a very common fault with triple lantern pictures. The second negative is made from a correct orthochromatic plate, and a plate sensitized to red is used for the third.

The positive used in the red lantern is transparent, not only to the pure red, but also to the red in composition in the orange and yellow ; the one in the green lantern transmits besides the pure green the component green in the orange, yellow and blue ; while the violet slide transmits pure violet and the violet ingredient of the blue.

There is one other point of interest in connection with the so-called orthochromatic plate. The name signifies correct color value. By that is meant a true representation of the luminosity, as measured by the eye, of the various parts and colors of the object photographed, when reproduced in the black and white monochrome. Photographic action is regulated far more by the kind of color, the hue, than by luminosity. On the whole, the most luminous, and, generally speaking, the most effective, color ingredient in a colored object or group is the yellow ; the blue, as a rule, being inferior. If, then, any one color class is to be represented by light, is to be luminous in the monochrome, it should be the yellow and not the blue, as is the case in all ordinary photographs. Sensitization to yellow and proper infiltration accomplish this result. It is always necessary to use a filter, however, in order to prevent the action of the blue-violet, which, together with the yellow, would destroy the balance in the monochrome, too much being represented as light. If the colors be grouped as before, into the blacks, reds, yellows, blues and whites, and two of these groups, one of which is the white, be represented as light, and the other three, which include the black, be represented as dark, the resulting monochrome seems to be well balanced.

An ordinary plate produces two groups, the whites and blues, as light regions ; a good orthochromatic plate without a filter reproduces three groups, the whites, blues and yellows, as light regions, while the same with an orange filter reproduces the white and yellow as light, and the blues, reds and blacks as dark parts, thus preserving the balance and giving a true orthochromatic result in the monochrome.

In conclusion, it may be fairly claimed that the subject of photography of color furnishes a most interesting and profitable field for investigation and study. It is of much worth to the scientist in dealing with the many subtle phases of the nature of light. Of no less importance is it to the artist who frankly acknowledges the aid derived from the analysis and synthesis of light by this means, and its bearing on the nature of pigment color. But the greatest value probably lies in the promise of its becoming a means of true education of the æsthetic sense with references to that much-neglected, not to say greatly abused, aspect, the color quality.

J. Stewart Gibson.

THE PHOTOGRAPHERS' ASSOCIATION OF AMERICA CONVENTION.

THE Convention of the Photographers' Association of America, to be held at Celoron, on Chautauqua Lake, June 22d to 27th inclusive, will, without doubt, be the most instructive and enjoyable gathering ever held by photographers in this country. The programme is a varied one, including every form of entertainment and instruction. A large skylight, of the most approved type, has been built, and full instruction in every department will be given by leading photographers from various parts of the country. The entertainment feature has by no means been overlooked, and Chautauqua Lake is famous for its beauties and the many advantages it offers to those seeking health and pleasure. Every photographer should go, and take his family with him. Special arrangements have been made to make things pleasant for the ladies, and all may rely upon having a most enjoyable outing. We append herewith details regarding railroads and hotels, and would be glad to furnish further information to any who are interested.

Those who contemplate exhibiting at the Convention should remember that all exhibits must be delivered in Jamestown, N. Y., in care of Photographers' Association of America, by June 15th, and also that applications for space for exhibits in the art department close positively on June 10th. All exhibits must be addressed to George Steckel, First Vice-President of the Photographers' Association of America, Jamestown, N. Y., and all charges prepaid. Application for space for exhibits must be made to George T. Bassett, 40 North Illinois street, Indianapolis, Ind. There will, undoubtedly, be the greatest opportunity for the comparison of work that has ever been offered, and we would strongly urge all professional photographers to send in samples of their best work, if only for the purpose of comparison. The amount of instruction to be gained from such comparison cannot be put down in words.

RAILROADS TO CHAUTAUQUA.

THE rates from all points east of Buffalo and Pittsburgh are made on the certificate plan, on the basis of one and one-third fares for the round trip. Members will pay a full fare going, and, when buying your ticket at your home office, get a certificate from the agent. At the Convention this certificate will be signed by the Secretary and special agent of the railroads, when it will be good for ticket for return passage on payment of one-third the amount of a full fare. Remember that this certificate cannot be secured on Sunday; they will be on sale at your home office three days prior to the Convention. Buy all tickets to Jamestown, N. Y. If, however, you desire to locate at Lakewood, conductors will carry you there on Jamestown tickets by requesting them to do so before reaching destination.

CHILDHOOD

Negatives on Climax Plates
by C. F. Neidig.

Half-tone and Printing at the
[illegible] Practical Process Engraving

West of Buffalo and Pittsburgh the remarkably low rate of one fare for the round trip has been secured, but tickets are only on sale for two days, viz., the 21st and 22d of June; all tickets good to return on or before June 30th.

The fare for the round trip from a number of principal points will be as follows:

Boston *via* Fitchburg, D. & H. & Erie R. R.	$14 20
Providence *via* N. E. & Erie R. R.	14 20
Albany *via* D. & H. & Erie R. R.	9 53
New York City *via* Erie R. R.	12 00
Philadelphia *via* P. & R., L. V. and Erie R. R.	13 07
Baltimore *via* B. & O., P. & R., L. V. & Erie R. R.	15 20
Washington *via* B. & O., P. & R., L. V. & Erie R. R.	16 80
Toronto *via* G. T. & Erie R. R.	6 96
or Str. G. T. & Erie R. R.	5 55
Buffalo *via* Erie R. R.	2 75
Pittsburgh *via* P. & L. E. and Erie R. R.	7 00
Cleveland *via* Erie R. R.	4 25
Columbus *via* C. H. V. & T. and Erie R. R. *via* Marion	8 40
Cincinnati *via* Erie R. R.	11 00
Dayton *via* Erie R. R.	9 80
Louisville *via* B. & O. S. W. and Erie R. R.	14 50
Detroit *via* D. & C. S. Nav. Co. Strs. and Erie R. R. *via* Cleveland	6 75
Grand Rapids *via* rail to Detroit, D. & C. S. Nav. Co. Str. *via* Cleveland and Erie R. R.	11 58
Chicago *via* Erie R. R.	12 00
Indianapolis, Big Four, *via* Marion, and Erie R. R.	12 48
St. Louis, Big Four or Wabash or B. & O. S. W. and Erie R. R.	17 75

Special parties are being made up in several centers, such as Chicago, where Charles R. Stevens, of 38 East Randolph street, is booking passengers for a special train. At St. Louis a party will be made up by stock dealers there. At Kansas City join Mullett Brothers' party. At St. Paul join Zimmerman Brothers' party. At Cincinnati the dealers are making up a party. At Columbus, Milwaukee, Indianapolis, Pittsburgh, Cleveland, Detroit, Toronto and Boston, parties are being organized by the dealers. At Philadelphia the Chautauqua Club, W. B. Kinderdine, secretary, No. 910 Arch street, expects Baltimore, Washington, Richmond and photographers from other points that way to join them on their special train leaving Philadelphia early Sunday morning, and arriving at Chautauqua Lake in the evening. A special train will leave New York Sunday morning at 9 o'clock, arriving at the Lake at 9.30 P. M. For particulars regarding passage on this train apply to Frederick J. Harrison, 591 Broadway, New York. All of Greater New York and New Jersey photographers are cordially invited to join this party, not for a moment overlooking our friends east of us who can make it convenient to join the party.

Special arrangements have been made with the splendid hotels at Greenhurst and Lakewood, and rooms may be secured at $2.50, $2 and $1.50 per day, by writing to us. By making all arrangements ahead of time, trouble and annoyance will be avoided.

NATURAL COLORS UNLIMITED.

"I WANT to dream my pictures ; not to paint them," said the famous artist, Turner, while the unprogressive process worker and professional pen wielder tells us continually, "We must not 'dream' of perfection by the three-color process."

He reminds us time and again of "process limitations," the "shortcomings of the screen grating," with a wealth of advice in general regarding the utter impossibility of ever attaining anything like satisfactory results by any article, method or appliance in use at this time, or, for that matter, at any other.

There is a perfect plethora of such writers at this time. Pleased am I to notice, however, that few of that ilk are found on this side of the Atlantic, being found mostly (and to perfection) in the European countries.

It seems that everything is "limited" with them, everything impossible ; but somehow or other they never seriously consider the "possibilities" concerning themselves.

I suppose a being gifted with reason has the common sense to put it in use. There is really no serious objection why he should not call into requisition his "mental balance" and reflectively weigh the facts of the case, making his own deductions and drawing his own conclusions therefrom.

I for my own part recognize no "impossible," except as the daughter of ignorance, born out of the age of darkness. Every age has its darkness, but the impossible of to-day is the successful achievement of to-morrow.

Beware, fellow-workmen, of this man of "limitations," this fossil of "impossibilities ;" rather let us meet and cherish the man of reason, the hewer out of results.

The Middle Ages were the cradle of human reflections. Men in those days buried themselves alive. Some sects yet exist. To-day, however, is the age of action, and this, combined with the reflective attributes derived from our ancestors, gives truth to the noblest prayer ever uttered by the great human family—action.

Ages of old-world conservatism may retard a great work, but it certainly can never stay the march of scientific truths, crush the progress of modern arts.

The tri-color method had its limitations of yesterday, but, like the stage coach of the past, yields to the scientific achievements of to-day.

A man is "limited" in speed to his legs in walking a given distance, a locomotive to so many miles compatible with its scientific construction; but he would be a god indeed who would define where speed commenced and a so-called vibration of light ended.

There is no limitation to tri-color work, no limitation to the screen grating, no limitation to color combinations derived from spectral pigments. The "limits" remain with the man and his hour. The unlimited remains with progressive thinkers and earnest workers—men whose talk is found as serious as their work.

To those recognizing limitations I would say, "Cast off the shackles that have descended upon you from the conservative past. Tear up the rails of antiquated locomotion, passing into the ways that open into untrodden fields for action and advancement."

Thank Providence that the days are passing "when any one can take a picture," and those at hand, when science, art and study alone can master the problem, when earnest and careful investigators shall be placed according to their work.

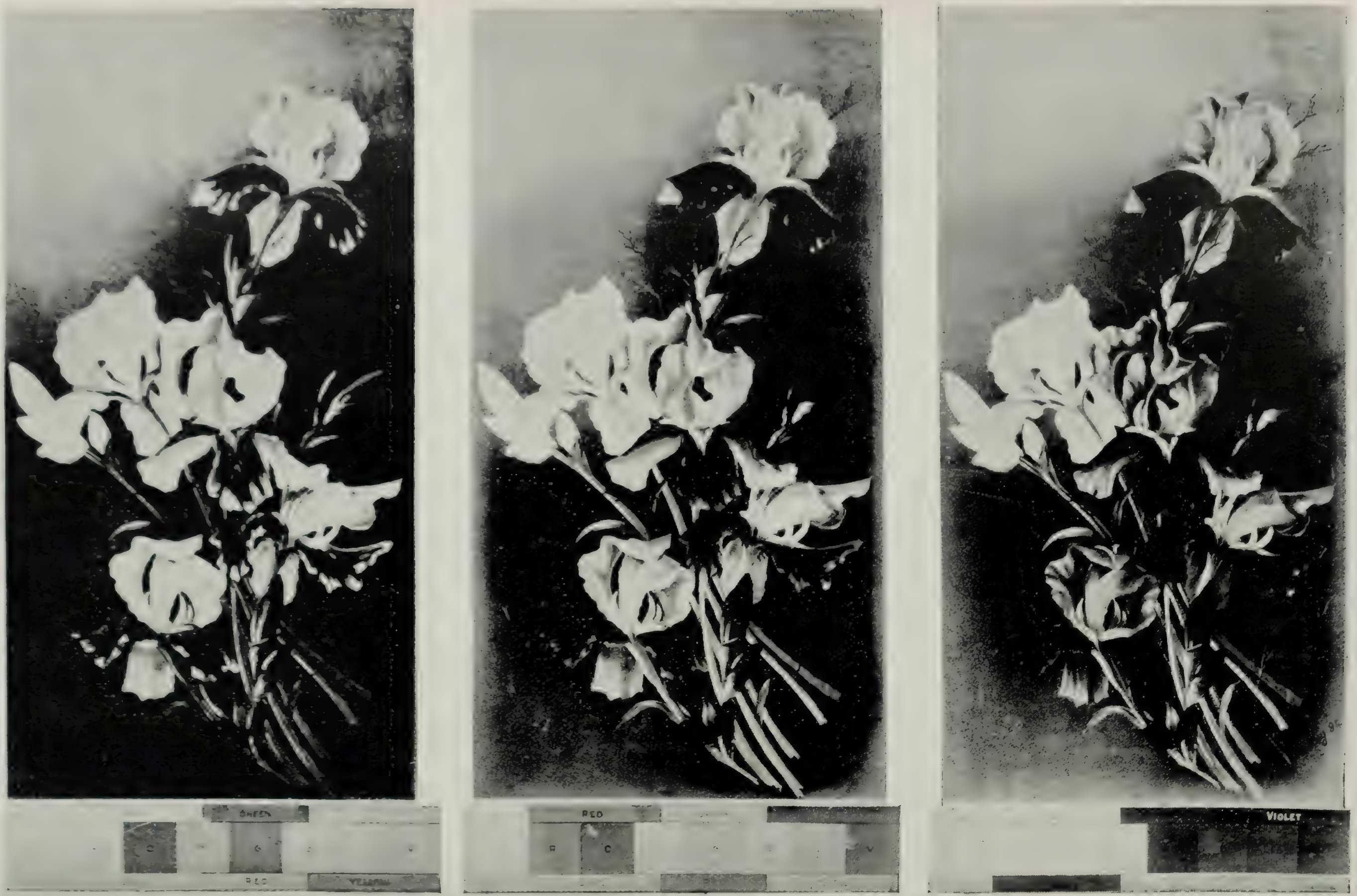
Macfarlane Anderson,
School of Practical Process Engraving.

MULTANGULAR LESSONS.

You have not seen the multangular grating because the opportunity has not yet been given to you, but I have both seen it and tried it, and I can hardly find words to express my wonderment at the possibilities that exist within this device. To be sure the whole thing has been clearly visible to the mental eye for a considerable time, from the fact that the invention dates back to 1892, and several articles have been written by the inventor touching upon the subject, but it is only within a short time that the opportunity came for actual practical test, and from these tests alone, without resorting to geometrical deductions, I am convinced that the possibilities are unlimited in the hands of intelligent operators. And as for variety, I believe there could be a different effect given to each and every negative that a person could make in a life time, and yet not exhaust the subject. The inventor has figured that the multangular grating is capable of ninety-four million changes. Can you grasp it?

I cannot begin to tell you all concerning my preliminary experiments with this grating, but I can show you, by means of the few illustrations accompanying these words, some effects that would be impossible to obtain with the old cross-line screen, and I am sure that every practical man will instantly recognize the wonderful utility of the new tool. The cross-lined screen is doomed. Even the much-heralded new four-line screen is a back number. The multangular can do all that either can do infinitely better and yet leave its millions of untried possibilities.

The illustrations which are used here were not primarily intended as object lessons in the use of the multangular grating, but rather as



YELLOW No. 1.   RED, No. 2.   BLUE, No. 3.

ANDERSON'S MULTANGULAR GRATING GIVING HALF-TONE VALUES.

showing the variations in three phusochrome plates, together with the color scale on each proof so that the different values may be observed and an opinion formed concerning the absorption powers of the fuso color filters as advertised elsewhere in the BULLETIN.

Nevertheless, I am of the opinion that the prints are worthy of careful examination with the glass, knowing that such an examination will reveal many wonderful effects.

I will endeavor to give a sort of analysis of the different prints, beginning by number, and describe the circumstances of exposure, the angles of the screen and the diaphragms used.

In the case of No. 1, the yellow printing plate (original negative made with the violet filter), the angles were 45 and 60 degrees, and the first named had three times the exposure of the second, the line in the middle tones being at the proper angle for color work for that of the blue values. This print is remarkable in one way, from the perfect distinction of the straight line and the stipple, and, while there is a loss of gradation, a primary result of the color subject and no fault of the grating, it shows distinctively what radically different results exist in the proper manipulation of the single-line screen.

With No. 2, the red printing plate (original negative made with the green filter), the angles were 90 and 45 degrees, and the first named 90 degrees or vertical line exposure had three times that of the one at 45 degrees. It will be understood that this is just half the angle that we have in the ordinary rectangular screen. When crossing at such an acute angle as this, the question of moiré effect would naturally arise, an effect that would surely occur if a cross-line ruled at these angles was used, because the exposure would be the same for both the 45 and the 90-degree line, while, with the multangular grating, the 90-degree had much the longer exposure.

On inspection it will be observed that the high-light dots are very minute, even entirely disappearing in the extreme lights, while the lower scale of light tones partake of the nature of a broken or undulating line. This effect gives much force and vigor as opposed to the stipple with a trend in the other direction.

In No. 3, the blue printing plate (original negative through the red filter), the angles were 45 and 55 degrees, being 10 degrees more than the usual rectangular screen. The exposure for the 45-degree line was four times that of the 55-degree line. In this case we have a continuous line in the middle tones merging into the fine dot and pure high light.

In all three negatives the exposures were made with the round diaphragm, the longest with *f*/32, and the shortest with *f*/45, screen separation in all cases being the same. Had the separation been greater or less, the features of line and dot would entirely change. This will be fully demonstrated in future numbers of the BULLETIN. As an object lesson in the use of our spectral chart when making color reproductions, with true color ray filters, I think these illustrations should be of great value, and when the thinking mind considers the time that has been devoted to these three separate, essential requisites, color filters, chart and grating, it will be obvious how much has been accomplished in the placing of phusochrome color work in the front ranks of tri-color at the present time.

A. C. Austin.

The spectral color chart is published in "Anderson's Photo-Mechanical Processes and Guide to Color Work."

IODIDE OF AMMONIUM.

As many of the half-tone process workers make their own collodion, it is suggested that, as in the days when the wet collodion process was used exclusively, the discussion as to fitness or desirability of certain chemicals should be resumed in the columns of the different photographic journals. In years gone by we find many articles on the subject, and recognize among the names of the writers those who have since become prominent in the profession.

Regarding the salt which heads this article a controversy has already sprung up, and as it is among those whose knowledge of photography has been gained since the advent of the dry plate, and who have not the experience of old timers to guide them, I should like to see in your columns letters that repeat the history of years ago.

Regarding iodide of ammonium, it is well known that at one time the only article offered for sale was a pure white crystal. This as a sensitizing salt was found too fresh for use, necessitating its being kept to ripen, and often it required weeks to bring it to a proper age. A French article was brought on the market, which, being quite yellow with excess of iodine, was found to produce a collodion that could be used almost immediately. Believing that the cause was the excess of iodine, those who used the white salt discovered that by adding tincture of iodine to their collodion it produced the ripening process. This created a demand for iodide of ammonium of a yellow or straw color, and which is still used by those who have continued using the wet collodion process for certain branches of their work, and is preferable to the use of the white salt, with addition of tincture of iodine. One of the photographers who dates back to the old wet collodion days writes me as follows, and his name is considered a strong backing by those acquainted with his ability. He says:

"For use in collodion I consider the yellow or straw-colored iodide of ammonium as far superior to the white. The yellow contains free iodine which the white does not, and collodion made with the latter must have tincture of iodine added to ripen it, which is unnecessary where the yellow iodide of ammonium is used.

Yours truly,

(Signed) Dean D. Crossin."

I should like to hear from others on the subject, and believe a revival of the old discussions would be interesting to a large number of your readers.

Yours truly,

H. S. Nutt.

May 15, 1896.

COLLODION.

May 16, 1896.

Editor of Bulletin:

Dear Sir,—I noticed an article in your May issue regarding the use of methylic ether for collodion, in place of alcohol and sulphuric ether as is usual and has been in use many years. I have known of tests being made with wood alcohol many years since, both in this country and in Europe, and would advise your readers to make any such trials in small quantity if they design to use it as a photographic collodion in connection with nitrate of silver. Eminent chemists have been over the ground but failed to find a substitute, and the only difficulty has been to procure at all times a pure-enough quality of alcohol and ether. Of course what is used for photography has no connection with such as may be desired for other purposes, of which there are many, both in surgery and the manufactures.

Yours truly,
H. S. Nutt.

The opinions expressed in the above letter are very much in line with our own ideas on this subject. The wet-plate worker cannot, of course, afford to discard his old and well-tried friend, collodion, for any new article, until the absolute efficiency of that article in any and all circumstances has been amply demonstrated and proven. All are familiar with the possibilities of trouble that lie dormant in the collodion and silver bath, and anything that gives promise of an increase of this trouble, or of a new stock of disasters, will be carefully avoided by the engravers. The article on the new solvent was inserted as being interesting to those of our readers who follow the subjects of photography and reproduction from a scientific interest in the same. Collodion will remain as heretofore the best friend of the photo-engraver.

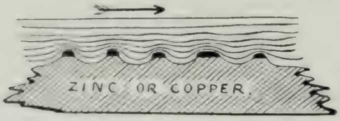
A NEW PRINCIPLE IN ETCHING.

In the January number of the Bulletin, page 29, was this paragraph: "I have tried electric and various other means to hasten the operation of etching plates in relief, and am convinced that the quickest method will result from letting the etching solution fall like rain from a height on the plate or plates to be etched. Now, who will devise a means of pumping the etching fluid to a height, so that it can be used over and over again, and also separate the solution while falling into drops?"

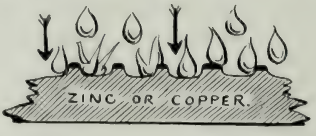
It is astonishing how extensively this simple little paragraph has been copied, and into how many languages it has been translated. It would seem to indicate that the leaders in photographic thought recognize in it the suggestion of a much-needed improvement over our present method of etching. As the subject has attracted such wide-spread interest, it is taken up again at more length.

Mr. C. T. Chesterman writes in *Process Work and the Printer*, London: "Anent the note from Anthony's Bulletin by Mr. Horgan, evidently he has taken the idea from the old French method of etching, yclept '*eau forte à couler*,' where the plate was placed at an angle of 45 degrees, and the etching fluid dashed upon it. Amateurs say that etchings done by that method have something superior about them to the ordinary plates, where the fluid is left on the plate. Most likely, the *raison d'être* of this is, that the metal, coming in contact with the air during the time that the biting is carried on, is attacked more vigorously and cleaner. I would suggest that plates to be etched are put in a bath, which is stood up at an angle of 45 degrees, or thereabouts, and at the lower corner place a vessel like a watering can, but, of course, acid proof. Now, the etching fluid, contained in a similar receptacle, is poured over the plate, and, running down, is caught in the first vessel. As soon as the whole of the mordant has been used, the empty receptacle is placed underneath, and the mordant is poured over from the other one, and *vice versa ad lib.*"

The idea of dropping the acid mordant on the plate to be etched would naturally come to any one who has rocked an etching bath and watched the acid flow back and forth over the plate, the etching solution operating with the greatest energy on the tops of the lines, and least in the hollows between the lines. Then, when one thinks of the powerful abrading action of sand when dropped from a slight height on hard substances, the idea of dropping the acid is suggested. I, however, remembered seeing, when a boy, how the raindrops from the shingles of our roof had bored holes in the stones on which they had fallen for years. So I felt that dropping acidulated water on a metal plate from a height would dissolve the metal away quicker than by simply letting it flow over it.



Acid Flowing Across Protected Lines.

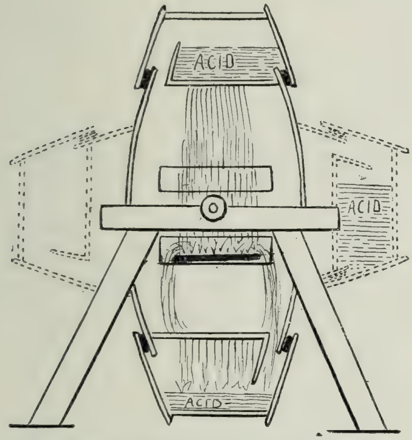


Acid Dropping from a Height on Protected Lines.

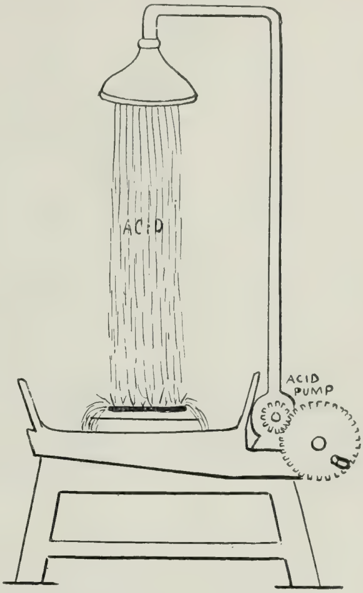
My first experiment was with a glass funnel from which the acid mordant slowly dropped on one spot on the plate, while the remainder was being etched in the ordinary way. This proved the principle to be correct, and ever since that time I have applied that method in intaglio etching, by pouring the mordant from a pitcher or large graduate on the plate resting in a porcelain tray. The mordant is then poured back in the pitcher, and used in that way over and over again. Artists have been astonished at the "stunning effects" I obtained, which are due, both to the privilege of local etching, and further to the much greater depth obtained by this method without spreading the lines.

The accompanying crude diagrams may give an idea of two suggested arrangements for dropping acid on a metal plate. The first is made by a cooper, of a long barrel and two butter tubs. Two rubber bands, like bicycle tires, shown in black in the diagram, are put around both ends of the barrel so as to make acid-proof joints between the barrel and tubs. The whole is bound together by iron straps, not shown. Two trunnions, resting on supports, permit the barrel to be inverted, so that when the etching solution is all in the bottom tub, a simple revolution of the barrel brings the tub filled with acid to the top, while holes in the heads of the barrel allow the acidified solution to percolate through on the plate, held by pincers in one of the longitudinal openings shown in the side.

Some readers state that there are various acid pumps in the market—a centrifugal one in particular—that, either worked by hand or by power, would easily raise the acid mordant to the small distance required. I have not had time to investigate the matter, but give here a diagram of an ideal arrangement for etching, if a practical acid pump can be found.



Barrel Arrangement for Dropping Acid.



Ideal Arrangement for Dropping Acid.

It is to be hoped that whoever experiments in this matter will publish the results he meets with, so that we can the sooner solve this problem once more offered for solution.

ANOTHER ENAMEL FORMULA.

A reader contributes the following as an improved enamel solution :

Clarified fish glue	1	ounce.
Pure gum arabic	1	"
Albumen	1	"
White rock candy	¼	"
Water	6	ounces.
Bichromate of ammonium	½	ounce.
Aqua ammonia	20	drops.

I regret that I cannot agree with him that it possesses any advantages over the simple enamel formula published in these pages long ago and now in general use.

CAUSES OF DEFECTS IN COLLODION NEGATIVES.

There is an extremely practical series of articles being published by H. Jenkins in the *Inland Printer*, of Chicago, on process engraving. In the May number he treats on the various defects which are liable to occur in the making of collodion negatives. He classifies them as follows:

Fog

May be caused by actinic light entering camera, plate-holder or dark-room and striking the sensitive plate, insufficient acid in developer or in bath, an unripened collodion, over-exposure, over-development, developer too strong or too warm, fumes of chemicals.

Transparent Spots in the Film

May result from dust in the collodion, in the bath or on the plate, excess of iodides in the bath, undissolved salts in the collodion.

Streaks in the Film

May be due to improper flowing of the collodion, scum on surface of bath, bubbles or specks of dust floating in collodion, removing plate from bath too soon, alcohol in the bath, in which case the streaks will be rather broad and wavy and run in the direction of the dip; developer containing insufficient alcohol, developer striking film with too much force, developer too strong, collodion too thick or over iodized, dirty plates, dirty plate-holder, which will sometimes cause blotches like "oyster shells."

Thin or Blurred Images.

Thin images may be caused by a weak or insufficiently iodized bath, under exposure or poor lighting of copy. Blurred images may be the result of improper focusing or the camera being jarred during exposure, while uneven density of film may be due to uneven lighting of copy or an uneven coating of collodion.

PROCESS POINTERS.

In carbon work, Mr. J. A. Sinclair recommends, as a substratum to enable drawing paper to be used as a final support, a 5 per cent. solution of gelatine, to 10 ounces of which 20 drops of formalin had been added.

M. Lippmann said, in a recent lecture before the Royal Institution, that in 1861 Charcot, Durand and a German worked on the three-color idea. He himself thinks there is a future for it, but the three photographs and pigments make it short of his ideal.

Hubert Herkomer's much-vaunted "New Art" that was going to supersede photogravure is now shown to be a "chestnut" by Mr. T. Bolas, who exhibits the specifications of Palmer's electro-engraving process of 1841. He also shows specimens of work done at that time, which are said to be superior to Herkomer's, while the methods are identical

C. D. Ahrens has been granted an English patent, No. 4,244, for a method of obtaining any desired color for the purpose of chromo-photography without the use of colored glass screens.

PROCESS TRADE NOTES.

Mr. Max Levy announces that, however abused the screens of his make may be, they can always be returned to him and at a nominal cost put in as good order as when new.

* * *

Mr. Charles B. Hall, of the well-known firm of steel engravers, 79 Fourth avenue, New York, has succeeded in making grain screens for half-tone work. He is a tireless experimenter, and only succeeded after many months of effort in that direction.

* * *

"Half-Tone on the American Basis" is the title of the latest book. It is the personal experience of Wilhelm Cronenberg, translated by William Gamble. It contains 160 pages, 68 illustrations, and is published by Percy Lund & Company, of London.

* * *

John Swain & Son, of London, who made a charming four-color photo-chromotype block for the Christmas number of the *Illustrated London News*, state that their charge for such work is 3s. 6d. per square inch per set.

* * *

John Royle & Sons, Paterson, N. J., have just issued a new edition of their catalogue of machinery and tools for use by photo-engravers. It should be on file in every process-worker's office.

* * *

Mr. Macfarlane Anderson has recently been granted a patent for "successively exposing the same sensitive surface to the action of light; protecting the parts previously exposed, and interposing between the lens and sensitive surface at each exposure a colored filter."

COLOR PRINTING EXTRAORDINARY.

Capt. Collardon showed recently, before the Royal Photographic Society of Great Britain, a print in colors made by an Italian gentleman whose name he was not at liberty to give. This inventor, he said, could print any number of colors in an unlimited edition at the rate of six hundred per hour, and in only two printings. By his method all the colors were printed from the first plate, while the second was a key block printed in brown, sepia, or black. The printing press which Capt. Collardon saw doing this work took a sheet of paper 42 inches. It was possible to print many pictures on the same sheet of different colors and character. He adds that if he had not seen the machine work, he would not have believed it. Many of the readers of this will remain incredulous until, like the Captain, they see the printing done before their eyes.

Stephen H. Horgan.

SUGGESTIONS IN ETCHING HALF-TONES BY THE ENAMEL PROCESS.

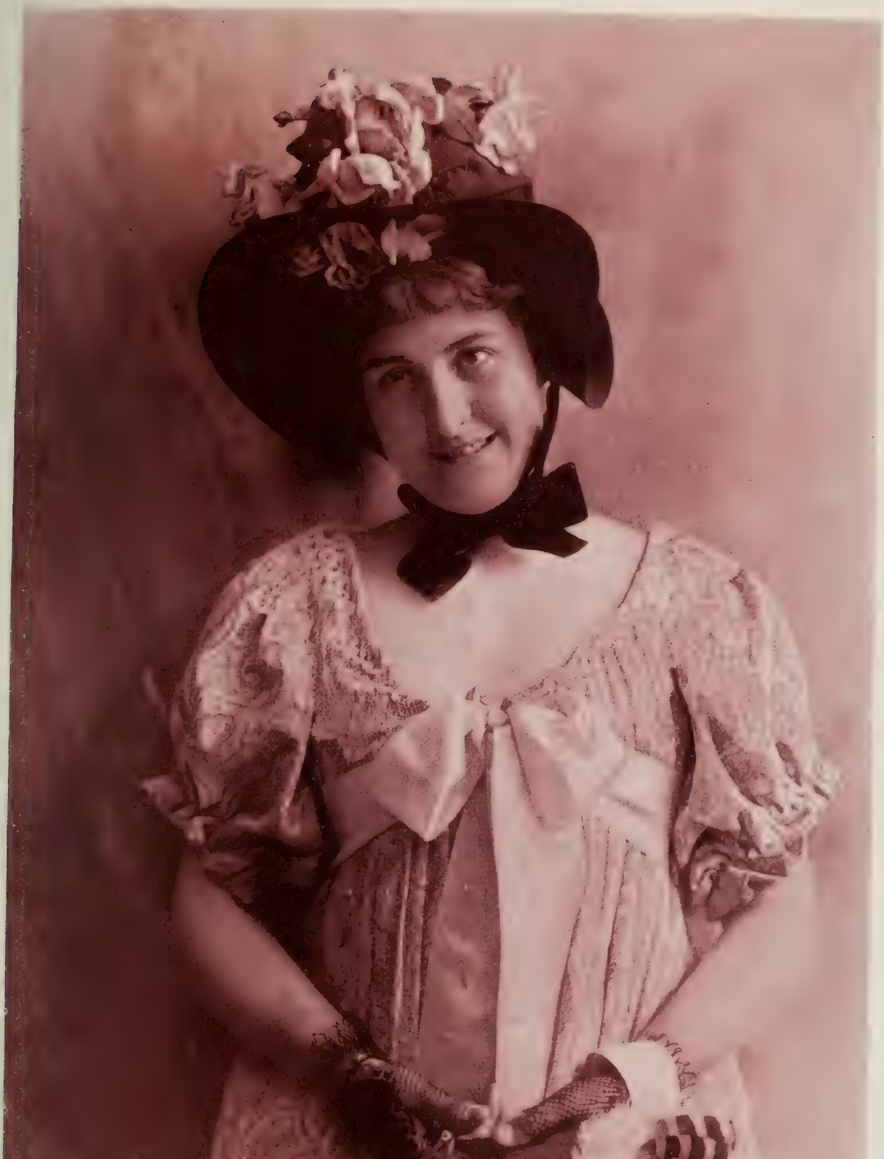
I.

THERE are many different things in etching to be taken into consideration to "build up" a good half-tone. Just how to treat different subjects when you have several on the same plate, to get the best results possible in a limited time, is sometimes perplexing. I will try and give a few suggestions which may be of value to those interested.

We will begin with a landscape having mountains in the distance and a tree or so in the foreground extending above the horizon. Suppose the original photograph is not exactly what it should be, the sky being a little dark, a thing which often happens. The photographer and etcher wish, of course, to obtain the best-looking half-tone it will produce. Frequently (if properly handled), the result is superior to the original. It has more color value in it.

Now to etch such a picture as I have just described is very simple, in fact the simplest etching when one is beginning to learn to "stage" or paint in. Suppose the plate is etched to a point where, if etching is continued, the color in the foreground and mountains will be lost, and still it is necessary to etch the plate further in order to lighten up the sky. This difficulty is overcome by means of a camel's-hair brush and a little asphaltum, together with practice, which teaches one to use them correctly. The mountains and foreground must be painted all over with asphaltum until entirely covered. Next the tree requires attention. If etched sufficiently, it, too, must be painted in, but it requires a great amount of care to do this nicely, in order that it will not show after the sky has been re-etched and your plate is completed. If the tree has foliage on it, take a camel's-hair brush, number about three or four, and use asphaltum a little thick so that it will not run (and after freeing your brush of the superfluous asphaltum by touching the plate several times on a part where it will not harm), begin and touch up the tree, holding the brush perpendicular, leaving little patches where the foliage is. The brush must not be wet enough to come to a point. If this is done neatly and carefully it will not be noticed when you finish etching the sky, which you may make as light as desirable. If the tree does not have foliage, a No. 1 camel's-hair brush can be used. The lines representing the branches must be traced out quite a little way so that they will blend off and not show. Be careful and keep on the line; if you do not, the result will be bad. If the trunk of the tree extends above the horizon it must be painted in, or the part above will be lighter than that below. Now re-etch the sky, and the plate is finished.

Let us next consider a group of portraits cut out and mounted on a large cardboard with a little pen and india-ink work around it, and which is to be vignetted. Sometimes all the portraits will be good, but more often, I think, one or more of the group will be poor. Often times the photographer can remedy this by making two negatives, and setting one in the other while stripping. But suppose you have such a



NEGATIVE ON CLIMAX PLATE BY
CHARLES W. HEARN, BOSTON, MASS.

HALF-TONE AND PRINTING AT THE
SCHOOL OF PRACTICAL PROCESS ENGRAVING.

subject to etch. It is poor, but the etcher ought to improve it; say one portrait is of a man with a mustache, eyes, hair and coat a little lighter than the others. By exercising care these parts can be painted in and held back sufficiently to compare with the rest of the group. If this portrait is vignetted, the coat cannot be painted in very well, except in the shadows, as under the lapels, etc. After that is done and etched and the faces are as you wish, you can paint in each portrait (if each one is cut in an oval or square, or any shape, provided it is lined around), painting in everything with the exception of the shirts and collars. They possibly may be light enough, but usually they will stand a little brightening, as this greatly improves the look of the whole group. You are now ready to etch again for a short time. This time you are etching for the light soft edge that a vignette requires. Watch the collars and shirts, as they may need to be painted in before the vignetted edge is light enough. I hold the plate in my hand, and with a little gum water, quite thick, or, better still, if you don't object, a little saliva, with my finger flow it all along the edge close to the portraits, and then, with a brush dipped in a good fresh solution of iron, brush lightly up to the edge, where it gradually blends off. Sometimes it is not necessary to paint in on certain subjects, such as draperies on a dress, etc. You can use a small brush and etch little places that want to be brightened without that trouble. This, of course, saves much time.

I have noticed printed in books and magazines a great many half-tones lined up with a black line so close to the line, especially in the corners, that the dots are much finer than in the middle of the sky. This is usually a fault in the etching. To overcome this, the secret all lies in not rocking your tub while etching, as rocking the tray will cause the solution to act much more quickly on the dots adjoining the black surface than in the center, as the flow of the iron is much more rapid at those places, causing them to etch faster. As soon as you have tried etching without rocking your tub, you will see how you have saved your dots from etching away, and that you have more color or roundness to your whole etching. In fact, you preserve the true value of your negative, and that is what you are after.

I usually use two etching tubs, sometimes three, but two are all that are necessary, one for an old solution, and the other for a fresh solution, using no water. I usually start with the old solution, and, after the plate has remained in there long enough to etch the middle tones almost enough, then I take it out and use the fresh solution to finish up in. This lightens up your picture wonderfully. I have my etching tubs arranged so that they can be rocked. On either side is a little button which I can turn down any time, which enables me to have my tubs set level and still. When I wish to look at my plate, I can turn up the button and examine either end of the plate I wish. This little arrangement is very useful.

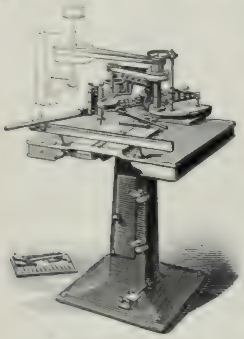
In re-etching, or etching the plate after it is proved, it is hard to get it free from ink. Benzine and turpentine, about equal quantities of each, cleans off the ink or asphaltum very nicely if you use a clean, dry cloth. Sometimes it is necessary to use a little alcohol.

H. WOODBURY SHAYLOR, Jr.

MECHANICAL AIDS TO PROCESS ENGRAVING.

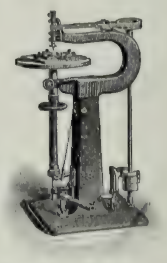
(*Continued from page 172.*)

IN the facing-lathe, the block is secured to a revolving face-plate while the cutting is done by means of an ordinary lathe tool, set in a movable rest and fed across the plate in the usual manner. The advantages of the facing-lathe are that it is a cheaper machine than the planer and requires much less floor space. The planer, however, owing to its range and power, is the preferable tool for large establishments, as it is often desirable to work blocking down from the rough lumber, and with the planer this is practicable.



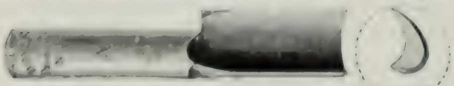
Movable Arm Router.

We now come to the router, the most important machine of all. The uses of the router are so familiar to all engravers that it is unnecessary to specify them here. Briefly, the router is a vertical milling machine for cutting away portions of plane surfaces, either of wood or the softer metals, and to perform its functions properly it should be constructed with great care. It is a high-speed machine in the fullest sense of the term, and it is this fact which makes it so extremely difficult to build a router that shall be durable and do good work. The speed at which a routing machine should be run varies considerably, according to the construction of the machine; the smaller routers having a spindle speed of from 6,000 to 9,000 revolutions per minute, while in the best routers this speed is increased to about 15,000 revolutions. It is even the practice, in some establishments, to drive routers at higher speeds than this, but nothing is gained by so doing beyond wearing out the machine unnecessarily, as the cutting powers of the router are practically fully developed at 15,000 revolutions, and any increase over this simply means greater wear and tear without any proportionate gain in efficiency.



Fixed Spindle Router.

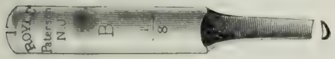
As in all high-speed mechanisms, such as dynamos, etc., there is perpetual danger of heating and disaster to the bearings, particularly of the cutting spindle, and trouble and expense can only be avoided by care and watchfulness on the part of the operator. Lubricating oils particularly adapted to the conditions which obtain in a router should be selected and intelligently applied. Many operators fall into the error of supposing that any common machine oil will do for the spindle of the router, and sometimes have to pay roundly for their mistake. An oil, such as would answer admirably for a slow-running machine, is often worthless for lubricating bearing surfaces subjected to extremely high speeds, and to avoid mistakes, it is always well for those unfamiliar with the care of a router to seek the advice of some reliable oil dealer, or, better yet, consult with the



Router Cutter for Wood

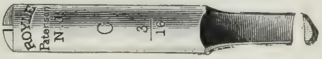
makers of routers, who are naturally fully informed on such points as these.

As routers are used for cutting a variety of materials, cutters of suitable form are provided for different classes of work. For wood, soft metal, etc., a cutter of fluted form, with considerable clearance, is used. Cutters of this style cut easily and smoothly in materials that do not offer any very great resistance. For cutting hard zinc, a cutter with a flat face has been found to do quicker and better work than cutters of fluted form. Brass, which is a comparatively easy metal to cut, also yields most readily to a flat-faced cutter of the same type as the cutter used for hard zinc, but as it is common to make very deep cuts in this metal, the cutting portion is made shorter and stronger than in the zinc cutter, the long blade of the latter rendering it too weak for heavy cuts in brass.



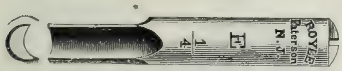
Router Cutter for Zinc.

Copper, in all its forms, is an exceedingly difficult metal to work, and gives more trouble, on the router, than any other. It has a grain of peculiar tenacity, and can only be cut away smoothly when the edge of the cutter is very keen. A special form of fluted cutter is used, in which the angle is very much more acute than in the wood-cutter, thus giving a better cutting edge, while the blade is made shorter and stronger. In routing copper, a little turpentine, spread over the plate occasionally, will be found to aid matters greatly.

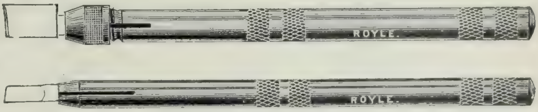


Router Cutter for Brass.

In all kinds of routing it is essential to good, clean cutting that the cutter be kept of correct form, and that the cutting edge be kept sharp. As the cutter wears away, it should be ground down on a small emery-wheel or grindstone, care being taken not to destroy the form of the cutter. As the blade extends nearly to the shank, and is of the same form throughout, by presenting the end of the cutter directly to the grindstone the proper form will be retained and the cutter continue effective until the entire blade be worn away. It is also of importance that a stream of water be run over the cutters continually while they are being ground down, as otherwise the heat developed by the friction between the steel and the stone will draw the temper from the cutter, rendering it useless. Cutters should never be ground on a dry stone, as it is certain to ruin them. Many operators hold the cutter against the grindstone by hand, but the handles now provided for this purpose are very much more convenient, and should always be used. In addition to grinding, it is well to touch up the cutting edges, from time to time, for which purpose a small oil-stone should be kept on the router, or elsewhere, within easy reach.

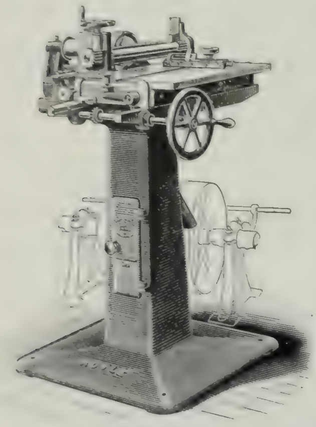


Router Cutter for Copper.

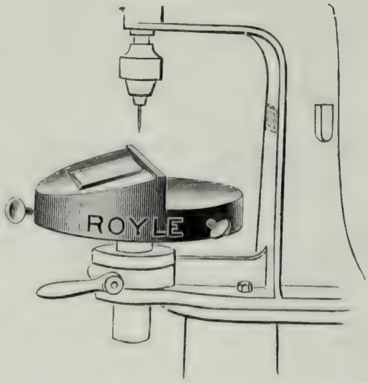


Cutter Handles.

To properly secure the finished plate to the block, a rabbet or bevel is cut around the edge, this rabbet being made sufficiently deep to bring the nail-heads below the surface of the plate, but not so deep as to seriously weaken the strength of the metal. This rabbet can be cut either on the router or beveling machine, and, in some cases, with shoot-board and bevel plane. When cut on the router, either a cutter of regular form can be used and the cut made in the same manner as in ordinary routing, or a beveling attachment, equipped with a cutter specially designed for this work, can be attached to the machine for performing this particular service. Neither method at all approaches, either in rapidity or finish, the work done by the beveling machine. When the router is used, the work is necessarily slow, and a slight burr is raised on the surface of the plate, which has to be removed by hand. With a properly constructed beveling machine, the work is done in an extremely expeditious manner and no burr is raised, the surface of the plate being left so clean as to entirely obviate all necessity for subsequent hand trimming.

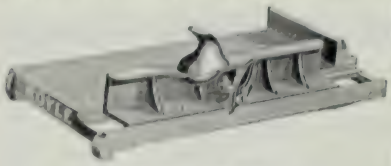

Beveler.

For economic reasons, the beveling machine should always be used in establishments where more than a very limited number of half-tone plates are turned out, as the saving in labor alone will pay for the machine in a very short time, and, aside from this, the character of the work is greatly improved.

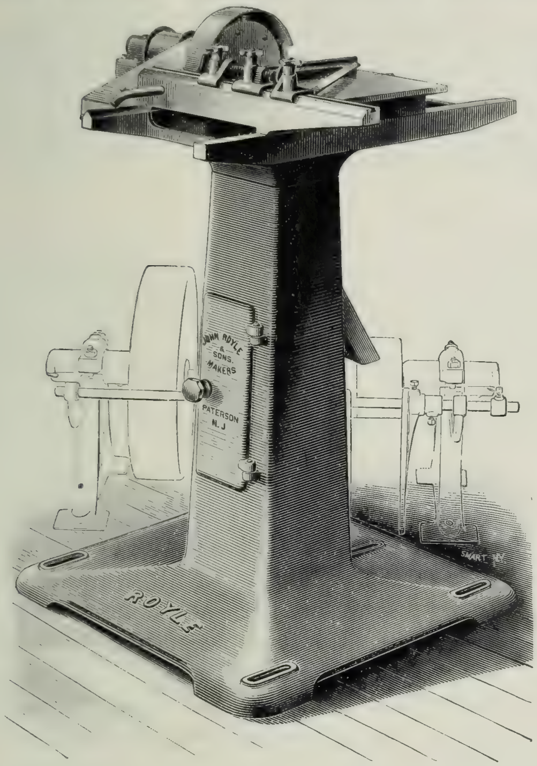


Drill, with Bevel Table.

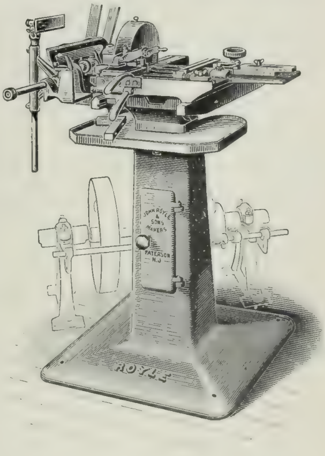
In this branch of the work, a small drill press for boring nail-holes in the plates is a great convenience. Drills are commonly furnished equipped with flat tables, but for drilling beveled plates an attachment known as a bevel table is used. This attachment has a bed which slants downwards, away from the drill, so that, when holes are bored through the beveled edges of plates, they are driven in such a manner as to utilize the full strength of the metal, and at the same time give the nails a firmer hold in the block than if driven straight downwards.


Shoot Board and Plane.

The plate having been fastened to the block, it now remains to make the block absolutely square and true, and this can be done with either the shoot-board, trimmer, or edger. The shoot-board is the simplest tool for doing this work, and, if skillfully handled, is very effective. It is a hand-tool, however, and therefore, of necessity, slower than power-driven devices for performing the same service. It is true that power shoot-boards have been tried, but have been very generally discarded as ineffective, besides being very dangerous tools to handle. Trimmers and rotary edgers are the true power-driven substitutes for the shoot-board, and are very generally used where large quantities of work are turned out. Trimmers are very simple machines, comprising a revolving cutting head and a movable table equipped with very ordinary gauges for squaring the work. The rotary edger, while belonging in the same class as the trimmer, is a much more elaborate machine and is much better suited to the requirements of high-class work. In the ordinary form of trimmer, no attempt is made to provide facilities for doing anything beyond squaring the block; this being done by establishing a base line arbitrarily, to which the different sides of the block are made to conform. This practice gives reasonably satisfactory results, when carried out in a sufficiently painstaking manner, but there is, in the trimmer itself, no provision made for squaring the block with reference to the engraving on its surface, which is, in reality, one of the most important things in the finishing of blocks. In the rotary edger, this and other deficiencies of the trimmer have been supplied, and by means of a very ingenious arrangement of gauges, very many things can be accomplished that are entirely beyond the capacity of the trimmer. The regular gauges for squaring blocks are all included, in greatly improved form, and, in addition, special gauges are provided by the use of which the engraving itself can be used as a guide for squaring the block, and also compound gauges, by means of which any number of blocks can be brought to a size without resetting the gauges.



Trimmer.



Rotary Edger.

The past decade has seen great advances made in the mechanical branch of photo-engraving, and the machines now used in first-class establishments are both ingenious and effective, materially lessening the cost of production.

The router and saw table are old and well-known machines, and their value and utility have long been recognized. The beveler and edger, the latest inventions in the field, are no less valuable than the first two, and there is no doubt that, in a short time, they will be deemed as indispensable as the first-named machines.

* * *

The "International Annual" of Anthony's Photographic Bulletin will henceforward be known as the "International Annual and American Process Year-Book." It is the intention of the publishers to make this popular annual of equal value to photographers and those engaged in the reproduction processes. Both will profit by the change, for photography and photo-reproduction are so closely allied as to be inseparable.

* * *

The color print in this issue of the Bulletin is worthy of and will, without doubt, receive the most careful attention of all, whether engaged in photography or photo-reproduction. It should be borne in mind that this is direct from Nature, and that everything from the making of the color screens to the final printing has been carried out at the School of Practical Process Engraving. Three-color work, as stated in Mr. Anderson's excellent article in this issue, has reached a stage when so-called limitations have no longer to be considered. Details regarding the production of work similar to this exquisite study are to be found in Macfarlane Anderson's new book, entitled "Anderson's Photo-Mechanical Processes and Guide to Color Work." Of this book Mr. E. Deville, Surveyor-General of Canada, and well known as author of "The Theory of the Half-Tone Screen" and of that excellent book, "Photo Surveying," writes as follows: "I have been diligently engaged in perusing your fine book on the photo-mechanical processes, and, although it will take many days to go through, I have seen enough of it to be in a position to offer you my congratulations. It is an inexhaustible mine of information, and a great part of it is not to be found anywhere else. The color illustration is a beauty, the half-tones are splendid, and the book itself tastefully gotten up. I am sure that it will prove extremely useful. With this book to show what you can do, the success of the school is, of course, a certainty. With best wishes for your success, believe me,

Yours very truly,

E. Deville."

* * *

All matter relating to the July issue of the Bulletin *must be in our hands on or before June 18th.*

OUR
Reviewer
School of Practical Process Engraving

In "Our Reviewer" column, which we inaugurate with this issue, we propose to criticise and comment on books, periodicals, samples of work, such as prints and booklets, apparatus, and, in fact, everything pertaining to the illustrative arts. The illustrations that appear in this issue will, perhaps, lend some weight to our comments, seeing that such comments will be made by those who have charge of an establishment wherein everything, from the making of the color screens and negative to the actual printing of the plate, is carried out. It is our desire to encourage the sending in to us of such articles for review, and we will endeavor to conscientiously and fairly criticise them.

"THE PROCESS YEAR-BOOK."—This year-book, the only yearly publication that we know of that is devoted exclusively to process work, has just been published, and when we say that it worthily represents the state of photo-reproduction at the present day we have bestowed on it the praise that is its due. Without exception, it is the finest collection of studies in reproduction and of practical reading matter on process-work that have ever been brought between two covers. To the publishers we offer our sincere congratulations; of the printers, the Cranford Press, of Chiswick, London, Eng., we would say that they have set a high standard of excellence hard to rival.

The illustrations are most interesting. Great care has been taken in the selection of subjects, and the seventy or eighty full-page reproductions include nearly all the processes employed at the present day—photogravure, glyptotype, half-tone in various effects, ink photo, collotype, dallastint, chemigraph, chromo-xylography, chromo-typography, chalk-grain half-tone, Husnik's photochromo-typography, and a color print by the Heliochrome Company are included.

The articles are written by men who have made their mark in process, and who have in every instance imparted knowledge, the value of which can hardly be estimated.

No photo engraver can afford to be without this book, which, despite the becoming modesty exhibited in the preface, is as perfect specimen of printing and photo-reproduction as he is likely to see for many years.

Our publishers, Messrs. E. & H. T. Anthony & Co., are the American agents for this year-book. Price, $1.

"THE YEAR-BOOK OF PHOTOGRAPHY AND AMATEUR'S HOLIDAY GUIDE FOR 1896."—This is an ever-welcome annual. Heretofore issued in December, its date of publication has been changed to April. It abounds in excellent reading matter, has a splendid guide for tourists, and is replete with valuable formulas and suggestions. Price, 50 cents.

"ANDERSON'S PHOTO-MECHANICAL PROCESSES AND GUIDE TO COLOR WORK." By Macfarlane Anderson. E. & H. T. Anthony & Company, publishers, 591 Broadway, New York.—This long-looked-for work will be welcomed by those who are interested in color work. Darkroom work, studio operations, the various photo-lithographic, collotype, and etching processes are treated to the finish, but especial care—the freshest part of the work—is given to three-color work. Various illustrations, full page, are supplied, all climaxed by the author's Phusochrome Chart, as already published in Anthony's BULLETIN. The avidity with which all knowledge upon these growing topics is sought for will cause a ready sale for this new work. The publishers have shown good judgment in the selection of the size of the volume. It is 5¼ x 7 inches, with flexible morocco cover and flap, so as to be most convenient for the pocket of the operator; thus enabling him to make a near companion of it for ready reference. It contains 182 pages and is finely printed. The price is $5. (From *Wilson's Photographic Magazine*.)

PHOTOGRAPHY OF THE PAST.—The May number of the *Practical Photographer* is extremely interesting. It deals with the history of photography, and is fully illustrated with portraits of such historically interesting personages as Dr. Diamond, Luke Price, Rejlander, Glashier, Niepce, Herschel, Daguerre, J. B. Reade, Fox Talbot, Scott Archer, Salomon, Kennet and Dr. Maddox.

"A HANDBOOK OF ILLUSTRATION." By A. Horsley Hinton. E. & H. T. Anthony & Company. Price, $1.00.—An excellent book that should be in the hands of all connected with photo-reproduction. It deals with the preparation of originals for half tone, giving valuable hints, and discusses the general theory and principles of illustration. In the chapter on mechanical aids to drawing, methods for tracing from a photograph, drawing on a print, blue print work and tracing on transfer paper are given.

"THE SHASHIN-SOWA," a Japanese photographic monthly edited by Y. Isawa, is illustrated with half-tone work, and contains an English-Japanese Dictionary of Photography.

"THE INTERNATIONAL ANNUAL FOR 1896."—Some few copies of this valuable year-book are still for sale. It is of particular interest, containing the original article on the multangular grating, which forms the subject of A. C. Austin's article in this issue of the BULLETIN.

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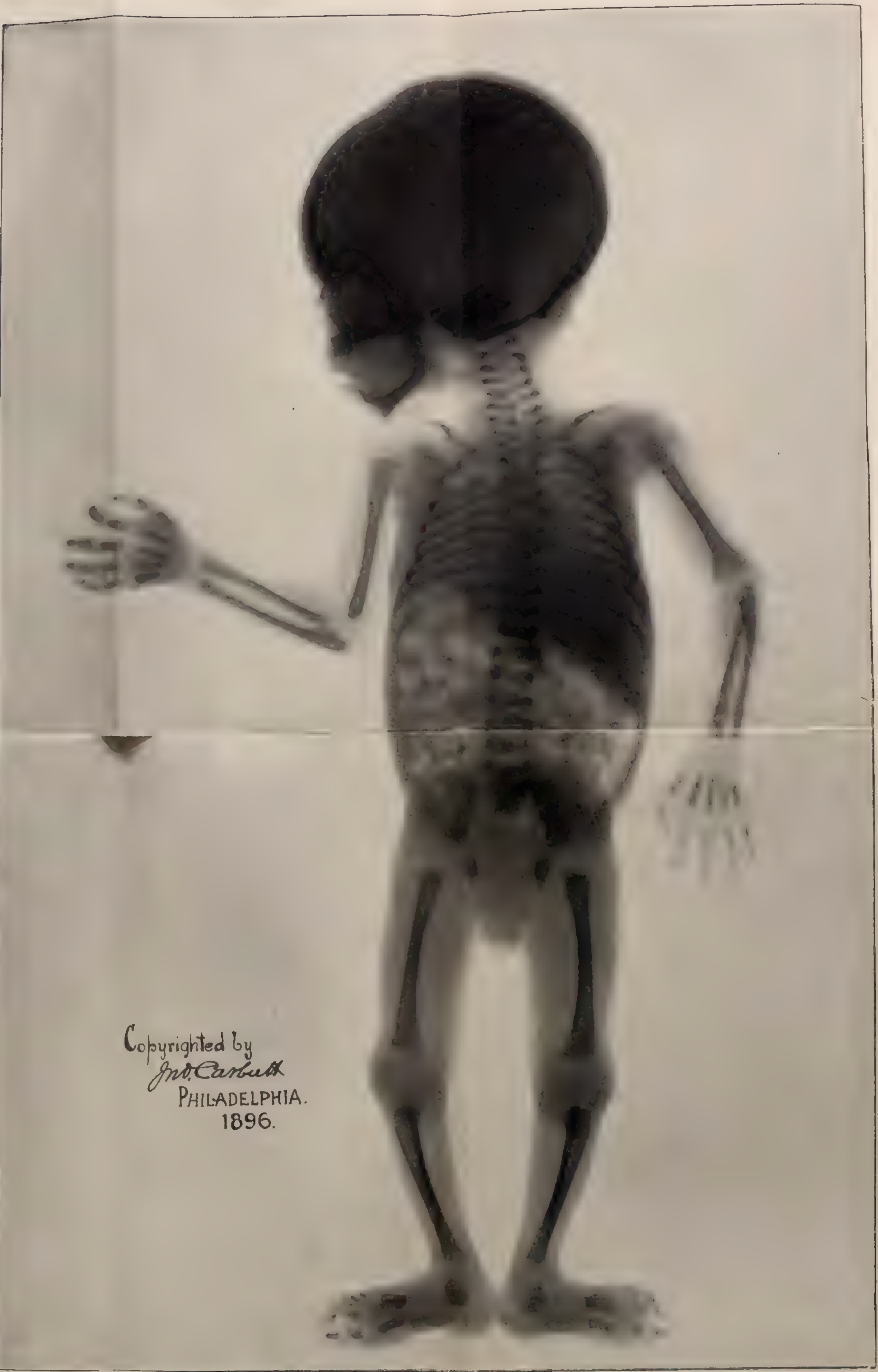

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33 South Sixth Street, Philadelphia, Pa.

Negative on Carbutt's X Ray Plate by
Prof. Arthur W. Goodspeed and John Carbutt

LIFE-SIZE RADIOGRAPH OF INFANT FOUR DAYS OLD.

ANTHONY'S

Photographic Bulletin.

EDITORS:

Prof. CHARLES F. CHANDLER, Ph.D., LL.D.
FREDERICK J. HARRISON.

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X-RAY PHOTOGRAPHY.

THE excitement created by the so-called new photography has somewhat subsided in unscientific circles, but the medical fraternity and those interested in photography from love of the subject have by no means neglected the opportunity offered by Prof. Röntgen in this new line of research, and the results that have been achieved within the last two or three weeks in this country seem almost incredible. Our frontispiece, for example, is a perfect representation of a male child, four days old, and the remarkable detail evident will surely impress even those who expected great things of X-ray photography, as being one of the most marvelous productions of the nineteenth century. To realize that, without any difficulty and in the short space of time of two and one-half minutes, a photographic negative may be made of the human body in which every bone is brought out with perfect distinctness is difficult; and in this frontispiece, made by two men who have given this new branch of photography the closest possible attention, we have such a result. For it we are indebted to Prof. Arthur W. Goodspeed, in charge of the Physical Laboratory University of Penn., and to John Carbutt, the pioneer dry-plate maker of America. We congratulate ourselves and our readers upon being able to obtain so unparalleled a specimen of X-ray photography.

Realizing the importance of the picture, we called on Mr. Carbutt, and at his perfectly appointed dry-plate factory at Wayne Junction, Pa., we were favored by him with the details of its production. However, before going into such details, Mr. Carbutt presented for our inspection a series of X-ray photographs that were in the highest degree interesting. An exquisite picture of the foot and knee, showing the knee-cap, and not only the bone, but detail in the bones; a picture of the hand with a small splinter of glass about one-eighth of an inch long near the tip of the index finger, which piece of glass, by the way, had been causing the owner of the hand considerable trouble, and was removed after the X-ray photograph had shown its precise location; a picture of the forearm showing curvature of the ulna; a very interesting picture of the arm, made to determine the location of a bullet which had entered in the upper part of the arm and passed below the elbow,

(Copyright, 1896, by E. & H. T. ANTHONY & CO.)

shown by the photograph to be in the middle of the radius, though the doctors had been probing around the upper part of the arm; a view of the throat, showing a jack-stone in the æsophagus, enabling the surgeons to work intelligently; several dislocations of the arm and many pictures of human hands, in which splinters, parts of needles and similar objects were embedded; but, after all, the picture that appealed to us most is the one that we have in this issue of the BULLETIN as frontispiece. Many pictures have been shown made from adults, but in this case we have a picture of a child four days old, and the partial bone formation is clearly shown. The exposure was made with the X-ray apparatus at the Physical Laboratory of the University of Penn., by Prof. Arthur W. Goodspeed, with a 10-inch spark coil working on a current from a storage battery, and with interruptions and breaks of two hundred a minute, connected with a focusing Crookes tube, the bulb of which was about 4 inches in diameter. The tube was placed about 18 inches from the plate, and the current passed through it until as shown by the fluoroscope the maximum effect was obtained. The plate, which was a Röntgen X-ray plate made by Mr. Carbutt, and which we can highly recommend as being the plate best adapted to this particular work, was not placed in a holder, but was wrapped first in yellow paper and then in a rubber cloth of fine texture. The room was not brilliantly illuminated, but was sufficiently dark so that there could not be any effect through the rubber cloth from daylight—that is, there was no danger of fogging. The subject being placed on the plate, the latter was brought under the Crookes tube at a distance of 18 inches, and the rays from the tube were allowed to act for two minutes and a half. The plate was then developed by Mr. Carbutt with the J. C. tabloids, and, though it was found to be slightly over-exposed, the result was everything that could be desired. This method of wrapping the plate in rubber cloth is of great advantage, for it is possible thereby to have the subject practically in contact with the plate. Mr. Carbutt has improved upon this idea, and is now prepared to furnish these plates in separate envelopes at a slight increase in price. The plate is first placed in a glazed black-paper envelope, and this in an outer one of yellow paper, the sensitive side being indicated by the smooth side of the envelope. On the back of the envelope is a space for numbering the negative and for details of exposure. In this way a physician, or one who is not an expert in photography, may purchase his plates, and, without recourse to the darkroom, may make such exposures as he sees fit through the envelopes and send them to a photographer for development.

The value of the fluoroscope is clearly indicated, for the Crookes tubes vary considerably in their fluorescence, and this variation is well indicated by the aid of the fluoroscope. We would strongly recommend photographers in our large cities to set up such apparatus and let it be known that physicians may bring patients to them for this work. The enormous value of this X-ray photography to the medical profession is perfectly evident. We have in our possession pictures of the pelvis that are absolutely perfect, and, indeed, of the whole skeleton of living beings twenty-four and twenty-five years old, with foreign and injurious matter clearly indicated in the photograph.

We desire to call special attention to the fact that the half-tone from which our frontispiece is printed was made from a negative on the Carbutt Process Plate, clearly demonstrating the fact that dry plates can be used with absolute success for process work.

Items of Interest

THE great value of ground-glass varnish for dodging the negatives for printing seems not to be fully understood by amateur and professional photographers. This varnish is easily applied, readily removed, and can be used for blocking out, by rubbing over it with a stump charged with graphite, or, indeed, with any coloring matter. It serves equally well for negatives lacking in contrast, and for negatives that have too excessive contrast. When it is desired to increase the contrast between the lights and shades, the back of the negative should be coated with this varnish, and the high lights strengthened by the aid of the stump charged with blacklead, the varnish over the deeper shadows being scraped away, leaving the bare glass. On the contrary, for negatives that have too great contrast, the details in the shadows should be worked up with the stump and the varnish scraped away from the too dense high lights.

* * *

OUR subscribers can help us considerably by showing our journal to friends interested in photography and in photo-engraving. We should be glad to furnish any of our readers with comments on our publication extracted from the newspapers and the journals. We believe that it is to the interest of each subscriber to increase our circulation, for with such increase in circulation we can introduce new features from which all will benefit.

* * *

THE G. Cramer Dry Plate Works write us that the destructive tornado which visited St. Louis on the evening of May 27th took off part of the roof of their factory and damaged part of their stock. Repairs were made with all possible dispatch, and there is no doubt but that by this time everything is in smooth running order again.

* * *

WE visited two photographic exhibitions in Brooklyn last month, the pictures in both of which were of a very high standard. We cannot, however, refrain from recording our conviction that judges are by no means infallible, and we hope that judging will be dispensed with altogether at exhibitions in the near future. It seems impossible for a judge to sink his preferences and view a picture from any standpoint except his own. A judge may be partial to pictures in which the detail is most painfully distinct, and he will then condemn everything which has not been made with the smallest diaphragm. Exhibition for the sake of awards is after all a mean piece of business. Exhibition for comparison and for mutual benefit is rational. We would ask our Brooklyn friends to dispense with judges and awards in the future.

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We note the death of Mr. Henry Reed Hollister, of Honolulu, Hawaii, well known as a photographic stock merchant.

* * *

There seems to be a probability that the diamond will be displaced as a medium for cutting glass by a compound of boron and carbon.

Half Tone on Zinc by Th. Vafiadis.

AN EGYPTIAN FAMILY.

That, it is reported, N. Moissan has discovered, by heating carbon and boracic acid in an electric furnace. The new substance is said to be black, and to be so hard that it will easily cut the diamond.

* * *

The *British Journal of Photography* says that at the Royal Society's soiree Prof. Worthington and Mr. R. S. Cole exhibited photographs of splashes, falling bodies, and of bodies dropped into liquids. The exposure in the case of the splashes was about three one-millionths of a second.

At a recent meeting of the Manchester (Eng.) Photographic Society Mr. Harry Wade demonstrated the preparation and manipulation of plain silver paper. For small work a smooth photographic paper, such as Saxes' or Rives', is the most suitable, while for large work Whatman's drawing papers are the best. Sizing and salting can be done simultaneously, the formula being,

Ammonium chloride	160 grains.
Gelatine	240 "
Water	20 ounces.

The paper is immersed in the warm solution and is then hung up to dry. As much as is desired can be prepared, for the paper keeps indefinitely. Sensitizing can be done either by brushing or by floating. Strength of the bath should be 60 grains of silver nitrate to the ounce, and the bath can be either an ammonia nitrate bath or an acid bath, the ammonia bath being made by adding strong ammonia to the silver nitrate solution until the precipitate first formed disappears. The paper sensitized on this ammonia bath gives a richer print, but will only keep for a few days. The acid bath is made by adding 23 grains of citric acid to each ounce of solution, and paper sensitized on this bath will keep for a long time. The paper should be floated twice in order to leave no bare spots. After printing, the paper should be well washed, and it may then be toned, fixed, washed and mounted as usual.

* * *

Fancy borders around prints can be obtained from quaintly shaped Christmas or similar cards. Some of these are scalloped, and others are shell or leaf shape. The untoned print is exposed to light under this card and printed to full depth, and the effect is oftentimes very pleasing.

* * *

In copying a drawing, engraving, etc., where there is not very much light, and it is important to get a sharp focus, it will be found helpful to have a ground-glass stopping very little light. For this end a few drops of glycerine rubbed well into the grain of the ground side, and all superfluous glycerine removed with a clean piece of rag, gives a very comfortable screen for this kind of work. A compound eye-piece must be used, of course. If glycerine is not at hand, oil or vaseline may be used.—*Amateur Photographer.*

* * *

The new officials of the California Camera Club, the most successful organized body of photographers in this country, are: President, E. G. Zeile; Vice-President, I. E. Thayer; 2d Vice-President, W. B. Webster; Secretary, H. B. Hosmer; Treasurer, E. G. Eisen; Librarian, W. C. Mackintosh. The Club has 162 active, 192 contributing and 18 associate members, and the Treasurer's report showed a good balance on the right side.

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All matter for the August issue of the Bulletin *must be in our hands not later than July 20th.*

Negative by Dr. E. B. Hitchcock. Half Tone on Copper by Kilburn & Cross, Boston.

"SHELTER."

THE WASHINGTON SALON.

IN our previous issue we called attention to the movement inaugurated by the Camera Club of the Capital Bicycle Club, having for its object the encouragement of really artistic work in photography. This exhibition was held at the Assembly Hall of the Cosmos Club, Washington, from May 26th to 29th, and was probably the most successful exhibition ever held in this country. The most prominent amateur photographers sent in their best work, which was divided into two classes, one being known as the Salon, and comprising those pictures that were of high artistic excellence, while the other was made up of pictures of technical excellence, though not quite qualified for the former class. One hundred and seventy-seven prints were hung in the Salon. Two crosses were awarded : A gold cross to Clarence B. Moore, of Philadelphia, the subject being "La Heine," a study of a female head, with melancholy, stern, forbidding features, a print of the greatest excellence. The silver cross was given to "Evening Light," by Alfred Clements, of Philadelphia, the picture representing a desolate, sandy beach, and the whole treatment being exquisite. So excellent was the general exhibit, that nine special mention cards were attached to other very meritorious prints. The second class was judged by Messrs. F. C. Beach, C. M. Gilbert and E. C. Messer, who awarded blue ribbons to the most deserving photographs, the judging being from a purely technical point of view. Blue ribbons were awarded to Miss Allen, W. G. Chase, W. H. Cheney, J. N. Dunn, A. L. Eidemiller, A. W. Hoyt, H. A. Lattimer, H. K. Noyes and L. Pettinghaus. The exhibition committee consisted of Messrs. Charles Richards Dodge, E. Lee Ferguson and Charles H. Schaaff, and they must feel gratified at the result of their labor.

Probably the most important outcome of the Salon has been the recognition by the United States Government of the merit of the photographs, and the purchase by the Government of some fifty of the pictures exhibited. Mr. Dodge, in an article which we print below, gives the details of this purchase and outlines also the policy to be pursued next year. We print also a letter from Dr. G. Brown Goode authorizing the announcement that the Government would purchase a number of the best pictures exhibited in 1897. A permanent Government collection of modern photographs having thus been thoroughly launched, it behooves photographers to take advantage of this and avail themselves of the opportunity thus presented of furnishing a permanent photographic exhibition. The Washington Salon is to be congratulated upon its magnificent commencement, and we hope the next year will see it even more successful.

The Cosmos Club is made up chiefly of the scientific authorities of Washington, and its influence in that city is very great. The great hall of the Club was filled with pictures, and the members were very enthusiastic. The local press devoted many columns to the exhibition, and at the opening the hall was more than crowded. The title of the exhibition for next year will be "The National Photographic Salon of 1897." We wish to assure our readers that the Salon has a solid and substantial backing, and that their promises will be carried out.

GOVERNMENT PURCHASE OF SALON PICTURES.

A CIRCUMSTANCE worthy of note in connection with the recent Washington Salon and Art Photographic Exhibition is that fifty of the pictures exhibited were selected for purchase by the United States National Museum, it being desired to preserve in Washington a permanent record of the standard of excellence in amateur photography illustrated by the exhibition of 1896. The works were selected by a committee composed of Dr. G. Brown Goode, Director of the National Museum ; Mr. T. W. Smilie, photographer of the Smithsonian Institution, a well-known expert, and Mr. Robert Stedd, an artist and architect of Washington.

The pictures thus acquired by the Museum will form a part of the collection illustrating the history and methods of the art of photography, which has been in process of formation for a number of years, under the direction of Mr. Smilie. This collection has not yet been exposed to public view, owing to lack of room in the present building, but it already contains many noteworthy objects, and, when arranged for exhibition, will show the history of photography from its beginning, and contemporary illustrations of most of the noteworthy advances in the art and works of the greatest photographers of the world. It begins with examples of the process of Wedgwood engraving, shows specimens of the work of Niepce, an original daguerreotype of Daguerre by Need Brothers, of New York. It may be remarked in passing that the collection still greatly needs specimens of the work of Daguerre and his early disciples. There is an excellent collection of early daguerreotypes and ambrotypes, some of them of remarkable clearness and beauty, including a view of the harbor of San Francisco in 1852, showing the dismantled fleet of the Argonauts, a remarkable piece of Shew, of California. There is also a unique series of daguerreotypes for the stereoscope. Next comes an example of the Talbotype, taken by Fox Talbot, the inventor of the process.

The introduction of photography into this country is illustrated by specimens of the little oval silver prints, first used about 1860 upon visiting cards, whence the name *carte de visite*, and from this time on, examples of portrait and landscape work by many celebrated photographers, showing the general progress of the art, including the magnificent large photographs made by the photographers of the early geological surveys.

Comparatively little has been done to illustrate the work of the last ten years, and an effort is now being made to complete the series, so that it will be a worthy representation of the progress of the art from the beginning until now. The collection has not kept pace with the recent progress of the art movement in photography, and the acquisition of the prints from the Washington Salon Exhibition of 1896 is intended to supply in part this lack. An effort will be made hereafter, especially in connection with the future national exhibitions of amateur photography, to secure such works as are necessary to make the collection in the National Museum a reference and record collection, which shall be not only a matter of interest and pleasure to the public, but of practical value to the photographers themselves. It is not necessary to enlarge upon the importance which such a collection as this must be to every photographer ; a collection in which he may see, side by side, the best works from year to year, and study the effects of light and time upon the permanence of paper and processes. The collection of the works of representative photographers is, of course, incomplete. This, it should be understood, is due only to the fact that there has not been opportunity to secure an example of their works. It is the purpose of the Museum to be absolutely impartial, and to allow fair representation in its collections to every person whose work is of merit. Besides the comparatively limited collection which will be exhibited to the public, which of necessity can include only one or two pictures of a kind, there is a large study and reference collection kept in drawers, protected from light and dampness, which is of even more importance to students of the art than the collections to be shown in the Exhibition Hall.

The pictures bought by the Museum from the Exhibition of 1896 were chosen with the idea that they should represent as fully as possible the different schools of amateur photography in America at the present time, and the work of as many as possible of the most characteristic and representative artists. The fact is fully recognized that the development of these schools is sought in amateur photography rather than among professional photographers, whose work is of necessity more conventional in its character, and affords less opportunity for originality and progress. The fact was also recognized that several professional photographers were represented in this exhibition, and characteristic specimens of the work of each of these were also secured.

The pictures just purchased will be early placed on exhibition in the National Museum. CHARLES RICHARDS DODGE.

(COPY.)

SMITHSONIAN INSTITUTION.

OFFICE OF ASSISTANT SECRETARY IN CHARGE OF UNITED STATES NATIONAL MUSEUM.

WASHINGTON, June 5, 1896.

MR. CHARLES RICHARDS DODGE,
Chairman of the Washington Photographic Salon,
Washington, D. C.

DEAR MR. DODGE,—I am very much gratified to learn that it has been decided to hold a second exhibition of art photography in this city under the name of the National Photographic Salon of 1897. The exhibition of 1896 must be regarded as the most impressive exhibition ever held in this country. It has demonstrated the right of photography to a place among the fine arts, and was suggestive of possibilities in the future which are by no means generally appreciated.

Such exhibitions are useful, not only to the photographers themselves, but to all those who have occasion to avail themselves of the possibilities of photography in the decorative and graphic arts, in the illustration of books and in the sciences.

I am desirous of utilizing the coming exhibition for the purpose of extending the photographic collection in the National Museum, and therefore authorize you to announce that a number of the best photographs there exhibited will be purchased.

Very truly yours,

(Signed.) G. Brown Goode,

Assistant Secretary.

THE THREE C'S OF PHOTOGRAPHY.

IT is a fact patent to all observers that only about one amateur in ten succeeds in making really good pictures when he depends wholly upon himself to do the work of developing, toning and finishing. I believe the vast majority of failures are due to a violation of some one or all of the three rules which form the fundamental conditions of success in photographic manipulations, viz.: Care, cleanliness and common sense. I have called them the "Three C's," and can assure every novice in photography that they are as important a part of his education as the traditional "Three R's" are in the education of the average school boy.

1. *Care.*—In seven years' experience as an amateur I have been forced more than once to fill plate-holders and develop plates, too, under very unfavorable conditions of light and shade, conditions, indeed, which any manual for the beginner would pronounce fatal. Nor have the resulting negatives always been ruined thereby. There is a "knack" acquired by practice which overcomes some natural obstacles to success; not all. But aside from these exceptional cases, and since the days of my callow novitiate, I have inscribed it with a pen of iron upon my photographic heart that the ideal medium for handling dry plates is total darkness. Every ray of light which falls upon a sensitized plate from the moment it leaves the original package to the moment it emerges from the fixing bath injures it to a greater or less extent. It will be understood that proper exposure is not included in this statement, but all other light is, from whatever source, and of whatever kind, whether red, green, orange, or a blending of all. An absolutely safe light is a desideratum. The most that can be said is that some kinds of light are less injurious than others. In the best darkroom obtainable I always make it a point to "work smart" in filling plate-holders. It pays.

In developing I generally flood the plate in a light strong enough to see that it is well covered; then, by turning about, throw the shade of my body over the tray, wheeling half-way around at intervals, to see that the development is going on properly. The filling up of cracks and crevices, to exclude all white light from the darkroom, is a duty too obvious to require comment.

2. *Cleanliness.*—I shall say little on this head, not because it is unimportant, but rather because enough of the right sort has been said

already. For the photographer chemical cleanliness in all his operations is certainly next to godliness. A muddy fixing bath is an abomination, when we take into account the relative cost of dry plates and hypo.

A turbid pyro developer, which has done service for two or three plates already, has outlived its usefulness—*requiescat in pace*. Speaking of developers, I almost invariably add a trace of potassium bromide to the pyro-soda solution when mixing, unless I am well convinced that the plate is under-exposed. It slows the development, and anticipates a possible blunder in timing, which even an experienced operator is liable to make in out-of-door work.

3. *Common Sense*.—The photographer should have a good share of this, and should use it freely in dealing with all practical questions which arise, and which are frequently a source of sore perplexity. Unless he shakes himself loose from the hard and fast rules of manuals, and plate makers, and paper manufacturers, he is little likely to achieve great success. I believe it is a good rule to study well the plate you are using, and then use it exclusively. That is what I resolved to do, when I first began picture-making. I ordered a certain brand, which proved satisfactory, direct from the factory to insure getting the same emulsion. The plan worked well, and so did the plates. The manufacturers gave me valuable hints on developing, and, accidents excepted, I never missed a good picture. Then suddenly, alas, the manufacture of this brand of plates was discontinued, and I was all at sea. I use now any good plate, and one stock developer for all, trusting to exposure and bromide to correct any defect in adaptability. In making the pyro solution I use 3 ounces of sodium sulphite in powder, and 1 ounce of pyro and water enough to make a pint; 4 ounces of sal soda in crystals, with enough water to make a pint, forms the alkaline solution. I dilute this with 6 to 8 parts of water for use. The soda salts are so liable to change strength by losing their water of crystallization, that a set formula is next to useless. I invariably notice that an active developer, mixed in the right proportion, flushes a pale, rosy red when the acid and alkali are brought together, and almost instantly resumes its former color.

The artificial drying of negatives is a moral monstrosity to many amateurs. They have a mental vision of waves of melted gelatine carrying on their sticky bosom the whole cherished landscape, which they have been at so much pains to immortalize. This happens sometimes. A soft film will bear a good deal of watching, but very little heat. A strong alum bath after fixing, and a final washing in ice-cold water, settles the matter in a manner wholly satisfactory. If necessary, a negative may be ready for the printing frame within two hours after fixing. A warm sun is the best drier, but a stove-pipe shelf will do the work if the fire is not too hot. In either case, watch the plate carefully, and withdraw the heat at the first sign of melting. In ordinary cases, the slow drying in a warm room is to be preferred.

Rev. Charles T. Smith.

THE USE OF SULPHITE.

SULPHITE of soda is, in a sense, the most important of all the ingredients of developers, for every other constituent may be changed and changed again except this. There, certainly, is the bisulphite of potassium, but this is, for all practical purposes, the same as the other, except that it is an acid salt, and so introduces an unknown quantity of acid that must be neutralized before the developer is made alkaline. It will probably appear strange to those who have not studied human nature that, although the first proposal to use sulphite was accompanied with directions apparently founded upon a correct appreciation of its effects, it seems to have been misused ever since. Mr. Herbert Berkeley, in 1880, in first suggesting the use of sulphite, directs that it be dissolved in water in the proportion of 8 grains to the ounce, a pint or so of the solution being prepared and used instead of water for all operations up to the alum bath before fixing. That is, the plate was first soaked in it, the developer was mixed with it, and after development the plate was washed with it. We fear, however, that these excellent directions were not the result of a full understanding of the matter, for a year later Mr. Berkeley says that he has made alterations in the method of using sulphite by which further advantages are obtained, and gives a formula in which it is dissolved in the stock solution of pyro in the manner that has since become general. From then till now the sulphite has been almost always proportioned to the pyro used instead of to the water or total bulk of the developer.

The object of sulphite is to prevent the formation of staining matter, and it is of little use to prevent this during development if it is induced by the subsequent washing. A mixed solution of pyro and sulphite will be found to darken by exposure to the air more readily the more it is diluted, so that the act of washing away a developer with water increases the probability of staining. This we have stated before, but that it actually is a fact was demonstrated very neatly a week or two ago by Mr. Alfred Watkins at the Royal Photographic Society. This staining is obviated by following Mr. Berkeley's first directions, that is, maintaining the proportion of sulphite right through. We commend this method to photo-mechanical workers who use gelatine plates. At the same time, it is not always convenient to make and use a large bulk of sulphite solution, and we believe the same end can be almost, if not quite, secured by a varied procedure that we have used and recommended for some years. The plate, after development, is rinsed, and at once put into the fixing bath, which contains sulphite and also sodium carbonate. After fixing there is so little developer left in the plate that washing with plain water is practically safe. But we should distinctly prefer to wash with a sulphite solution before fixing, if perfect freedom from stain were desirable, as in negatives for photo-mechanical work. And it may be remarked that alkaline developers, properly used, will give no stain, while ferrous oxalate is very likely to cause a slight stain, even when used with care.

The quantity of sulphite required in pyro development depends upon the alkali used, the quantity of the alkali and the time occupied in development. Mr. Berkeley's first recommendation of 8 grains to the ounce is an excellent proportion for use under the conditions he specifies, namely, with ammonia as the alkali, and a period of development extending to from eight to twelve minutes. We arrived at a proportion of 6 or 7 grains to the ounce by our own experiments, but we generally used rather less ammonia (before we gave up ammonia for carbonate of soda) than is usual. A little extra sulphite does no harm; and it is well to be on the safe side. But if carbonate of soda is used as the alkali, such a quantity is wholly insufficient. Fifteen grains to the ounce is the minimum in this case, and it must be increased if a full quantity of alkali is employed, or if the time of development exceeds ten to fifteen minutes. These proportions are, of course, approximate only, and very probably will be affected by the nature of the plate used, the character of the water and the temperature, but they will be found to be a sufficient preliminary guide.

For a long time sulphite of soda was but little appreciated, and, although it is now largely used, there still remain a few photographers who consider that it is prejudicial; they prefer to have the stain, and not without a certain degree of reason. Where there is the largest quantity of silver reduced to the metallic state there is obviously the largest quantity of pyro oxidized, and in the absence of sulphite there is therefore the largest deposit of staining matter. The stain reinforces or intensifies the silver image. If the air has free access to the developer for a long enough time, the solution itself darkens and produces a general stain over the whole film. This uniform stain is probably useless, but the image stain may improve the printing quality of the negative. Still it is always a mistake to have such stains, and they are never necessary. If a staining developer suits any particular make of plate, it may be taken for granted that the plate is not what it ought to be, and probably poor in silver, or so badly made that the silver is not available. If an exposure has been so rapid that an insufficient amount of silver has been changed into the developable condition to give a dense enough image, the stain may help, but such a compound image is no better than a broken reed to rely upon, for it cannot be produced with certainty; it will change during the washing of the negative and can never be regarded as permanent. Moreover, it is always possible by intensification to produce a far greater effect than that due to any such method and to ensure a good image of a permanent character and with the gradation not falsified. There is no character of negative to be had by the use of a staining developer that cannot be more certainly obtained without any stain at all, and any photographer who finds it impossible to realize this fact is deficient in his knowledge of photography. One fact, however, may be pointed out that does not seem to be generally recognized, namely, that the mere washing of a stain image probably always has a reducing effect upon it which affects the shadows more than the lights, altering, of course, the character of the gradation. If such an effect is wished for, it can be obtained with a pure silver image by the application of any of the usual reducing solutions. To get rid of developer stains there is probably nothing so efficacious as a dilute solution of caustic soda, but, whatever is used, alum and acid solutions should be avoided.

Chapman Jones, in *Photography.*

PHOTOGRAPHY WITH THE BICHROMATE SALTS.—SCIENTIFIC AND HISTORICAL PRELIMINARY.*

I HAVE been asked to give a scientific and historical preliminary lecture on photography with the bichromate salts. I like the first prefix a great deal better than the second, that is, the scientific aspect better than the historical. For my own part, I would much rather spend two hours in making experiments than I would spend one in turning over the pages of musty back numbers of photographic works to ascertain what is an unimpeachably correct history of the subject with which I have to deal. Of course, it is necessary to have a general idea of the historical sequence of an invention or discovery, whatever it may be; but to love history requires a particular bent of mind, and that bent of mind is not mine; and all I am going to do to-night is to tell you, as far as I can, the orderly sequence in which photography with the bichromate salts was discovered. I am laboring under one very great disadvantage—I have left my notes behind me, and consequently my dates are only given from memory.

The first date that I have to mention is 1838, the year when photography with the bichromate salts was, practically speaking, discovered. In 1839, Mungo Ponton showed that paper soaked in a solution of bichromate of potash was sensitive to light, and that a brown image was formed by its action when the paper so treated was exposed beneath a map or plan. If, for instance, the paper were exposed beneath an Ordnance Survey map there would be yellow lines on a brown background. This piece of paper has been soaked in a 5 per cent. solution of bichromate of potash, and, after drying, exposed beneath a negative, and here you see the

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*From Six Lectures on "Photography with the Bichromate Salts," delivered before the Affiliation of Photographic Societies, London, Eng. Reprinted from *The Photographic Journal.*

result: the yellow color, which in this case forms the background, can be washed out, and there would then be an image varying between brown and white.

The next step was made by Becquerel, in France, in 1840. He found that it really was not the paper, *quâ* paper, which enabled bichromate of potash to act, but that it was the sizing of the paper which caused the reduction of the bichromate by light. In order to test that, he coated paper with starch and bichromate of potash, and then, having washed out the bichromate, he treated it with iodine, and by that means he was able to get a blue image with a brown background, showing that the starch was really decomposed by the bichromate of potash, leaving it unaltered where the light had not acted. So here we have come to the fact that it requires what is commonly called organic matter of some description to be affiliated with the bichromate of potash in order that an image may be formed.

The next name is one which ought to be dear to every Englishman, for he was the father or co-parent of photography, namely, Fox Talbot. In 1853 he took up the question of bichromate of potash and organic matter, and used gelatine—as far as I am aware, he was the first to use gelatine in connection with this salt—and coated copper plates with it. Here we have a small copper plate which has been coated with bichromated gelatine and exposed under a portion of a negative. Now, if we wash out the bichromate, and place it in a solution of perchloride of iron, the copper will be etched in proportion to the solubility of the gelatine, of which, by the bye, I have not spoken at present.

Now, the question comes, How was it that the etching could take place through gelatine which had been treated in that way and exposed to light? It was in this way: It was found that the gelatine which had not been acted upon by light was, as it were, porous, and allowed the solution of perchloride of iron to soak through the gelatine and arrive at the copper; and so chemical decomposition took place, and the copper was thus eaten away, and, of course, depressed surfaces were formed where the light had not acted. Where the light had partially acted, the eating away was not so vigorous, and where light had strongly acted, the action was nil. I have seen one or two of the original plates by Fox Talbot, and they do not leave very much to be desired, and I do not see that there has been any remarkable progress in this kind of photogravure since his time, except in matters of detail. As far as this process is concerned, it remains very much as Fox Talbot left it, though, of course, improved by practice.

Next in order of sequence we come to another great name, this time in France—Poitevin (1855). I think he may be said to be the father of photo-lithography. He utilized the fact that albumen, when in contact with bichromate of potash, became insoluble on exposure to light, whereas the part which was not acted upon by light was soluble and easily washed away. On this piece of paper I have simply a layer of albumen which has been mixed with bichromate, and which has been printed under a negative. It was prepared by floating the back of the albumenized paper upon a solution of bichromate of potash, allowing the bichromate to penetrate, but was not for a sufficient time on the albumen to dissolve it. Printing ink was spread over the surface, and when again dry, the paper was ready for development. This was effected by soaking in cold water, and washing away the albumen and the ink from those portions which had not been acted upon by light. In this process, as I have said, we have the germ of photo-lithography; the method of using albumen for lithographic transfer is used at the present day in some processes, and has a distinct advantage in the fact that the layer of albumen is so very thin that the ink is not raised up in ridges as it is in processes where soluble gelatine is washed away.

It was Poitevin who found that gelatine which had not been acted upon by light would dissolve away in hot water, whereas the part that had been acted upon would not wash away. This piece of paper has been coated with gelatine with which india ink has been mixed, and then treated with bichromate. When dried it was exposed under a half-tone negative.

When Poitevin began to develop his pictures he got the same result that I expect we shall get here, that is, very little; we shall probably find that most of the gelatine will flake away, although the image itself may be there. Now, I would ask you to think in what condition the paper is at the present time, having been exposed in contact with a negative. It is this—that the top surface is insoluble, while the surface next the paper must be soluble; so all we can expect when we develop is that we may get a bit of the best exposed part of the image left on the paper, the rest being washed away. You will see that this is the result we get, only those parts remain on the paper which have been thoroughly exposed to light (shown). Poitevin was thus under a great difficulty in developing his pictures, and he had to use extraordinary precautions to get any half-tone image at all.

Burnet (1858) was the first, I believe, to produce an image which could be developed with any degree of satisfaction. He argued, of course, that what was required was to get the hot water (which will dissolve away the gelatine) in contact with the soluble gelatine, and evidently, if you wash it away between the paper and the gelatine, the upper surface must float off and no image will be obtained. So he exposed the paper through its back. We have here a piece of paper which has been exposed, through the back, under a negative, and it will be seen when we develop it we shall get half-tone. This piece of gelatine tissue is home-made, and is colored simply with india ink, so that we have not all the refinements which the Autotype Company are able to give us, and the print will probably not be very sharp. At the present day it is by some persons considered *chic* to have everything as coarse as possible; and I daresay Burnet's process, if they only knew it, would be adopted by that particular school of artists who love to have everything blurred and grainy.

The next name that we have to mention is Fargier (1860), who felt the difficulty that existed in printing through the paper. Fargier saw what was the *crux* of the matter; and he determined that he would print on the surface of the gelatine and then get at the back of the gelatine film—that is to say, that surface which was next the paper. This he could do by removing the paper. He exposed a piece of tissue to light under a negative, and then coated it with castor-oil collodion—collodion to which a few drops of castor-oil had been added for the purpose of toughening it—next he put the tissue face downwards on a glass plate, and placed the whole in hot water. By degrees the gelatine in contact with the paper was dissolved and allowed the latter to be removed. He then had his film of gelatine, forming the image, resting upon the collodion and also supported temporarily upon the glass plate. After he had developed the image, it was necessary to cement it on to paper, and he had his carbon print. Here is a print that has been produced in that manner.

I do not know whether it has ever struck you what an excellent thing we have at hand in most of our photographic rooms, in the shape of spoilt celloidin films, for carbon printing. I am going to point out to you how you can adopt Burnet's plan by the use of these films. If you have a celloidin film it is very easy to expose it through the back and get an image which is, practically speaking, sharp on the gelatine surface. The film is immersed in a 3 per cent. solution of bichromate of potash, and, when dried, provides a means of obtaining a very good transparency. We have here such a film which has been exposed through its back to a negative; simply putting it into hot water, the bromide of silver is washed away with the unaltered gelatine, and that we get an image left in bromide of silver wrapped up in gelatine. Films can be used for collotype or photo-lithographic purposes in exactly the same way.

The next point is, can we do anything more with such a transparency? Yes, we can; it can be made into a silver print very readily. Soak it in water, and pour a developer on it, and you get your image in silver. This reminds me of Mr. Bolas's method of getting a reversed negative, which he did in exactly the same way, except that in his plan you do not wash away the gelatine, but by this plan you do; when you do not wash away the gelatine you get a reversed negative, and when you do wash away the gelatine you get a positive. The great thing is to thoroughly wash out the bichromate, for, if left in the gelatine, the developer would be oxidized, and for no purpose. Mr. Bolas's method is a very pretty and easy way of obtaining reversed negatives, and I am rather surprised that it has not been more generally adopted; it also provides a use for spoilt plates or films.

We now come to the next advance, which was Swan's single transfer process (1864). Swan was the first, I think, to issue carbon tissue commercially. His method of treatment was a little different to that of Fargier; he transferred the film of gelatine to gelatinized paper made insoluble by chrome alum. You can quite see that if you get the gelatine image on gelatinized paper, by removing the back surface of what we may call the bichromated tissue, we have gone a step further than any one had gone before. But the great point was that, the picture being reversed, it was necessary to re-reverse it and get it on to other paper in its proper position. Swan effected this by coating the paper or plate to which the image was first transferred with india-rubber solution. After development he put the developed image in contact with the front surface of the gelatine, allowed it to dry, dissolved off the india-rubber, and so got his print re-reversed. This is, roughly speaking, Swan's process.

The next step was Johnson's process of carbon printing (1869), in which he transferred the image bodily on to a surface, such as zinc, ebonite, porcelain, waxed paper, etc. This he effected, not by pressure, which Swan used—though Swan was not obliged to use it—simply by the fact that gelatine in a certain state adheres to these surfaces. The surface used being coated with a proper vehicle to prevent the gelatine permanently adhering to it, he was able to retransfer it to the same kind of gelatinized paper which Swan used in his first process.

This is a very brief and incomplete history of carbon printing up to a certain point, and from that point it will be taken up by Mr. Sinclair. But there is another point that we have got to deal with, and that is the fact that gelatine, when it has been acted upon by light, not only becomes insoluble, but to a large extent repels water. Supposing we have two strips side by side, one of which has been acted upon by light, and the other of which has not been so acted upon, and soak them in water, and then rub grease of some kind over them—on the surface where the light has acted, the grease will hold, and on the other part it will be repelled—the water held by the gelatine will repel it. Further, it has the property, that where the light has only partially acted the grease will only partially hold. You can see, then, that if a sheet of bichromated gelatine, which has been exposed under a half-tone negative, is immersed in water, according to the different intensities of the light which has acted on it, the water will be more or less soaked up. From this cause where the light has strongly acted a greasy ink will adhere strongly, and you will have a very black surface; where it has only partially acted, a smaller quantity of ink will adhere, and where the light has not acted at all, no ink will be retained. Further, if that film of gelatine is on a flat surface, and it is put in a press with a sheet of paper in contact with it, an impression of the picture in printer's ink can be obtained. This is the foundation of the collotype process, which will be treated by Mr. Debenham in a much more explicit way.

The print I show on glass is an example of the principles which underlie another process, that known as Woodburytype. You will see that the parts which are transparent are really depressions, and where you have great blackness there are not depressions, but elevations. If by any means a mould of such a surface can be taken, you will have a surface reversed as regards depressions and elevations. Woodbury pressed such a film into soft metal by heavy pressure, and so got a mould which, when filled up with liquid gelatine, was a counterpart with the print. Mr. Bolas showed that a mould could be obtained by a very much easier plan. With fusible alloy he was able by certain manipulations to get a perfect impression of the mould. I am not going into the Stannotype process, because that would take too much time, but this print formed of elevations and depressions is its foundation, as it is of Woodburytype. As far as photo-lithography is concerned, we have not got much further than the days of Poitevin.

It now remains to show you that not only is the bichromate sensitive to light, but also the common ordinary yellow chromate. The bichromate of potash, roughly speaking, is a molecule of potash combined with two molecules of chromic acid ; anyhow, there is one base and two acid molecules, while in the chromate we have one base and one acid. I do not know that the chromate has been utilized very much, or at all, but I have here a transparency produced in exactly the same way as that produced by the bichromate, except that the chromate of potash was used instead of the bichromate. Transparencies such as this made with a gelatine plate can be readily converted into a silver deposit in the same way as before.

There is still one other point which I may mention—it is a little personal to myself, and, therefore, I mention it with due diffidence—namely, a peculiarity in the action of light on bichromate of potash when in contact with gelatine, and that is, that when you take the tissue off the negative the printing action does not stop, but continues. Many years ago I made experiments and found that carbon tissue if exposed for one-fourth the proper period and kept hung up in a darkened room for fourteen hours would, on development, yield a print of full intensity. At that time I was teaching photography at Chatham, and had to do a good many carbon prints for the War Office, and I found that in the winter time it was a very great saving of time to give a quarter the proper exposure and let the continuating action of light do the rest. Mr. Foxlee afterwards took the subject up, and, I believe, found the action was due to moisture in the air. I did not explain it ; I had got my own idea, but there is not time to enter into the chemical theory to-night. It is useful to explain it as a catalytic action, a term which is applied when explanations have to be vague.

For some purposes it has been said that it is absolutely necessary to get a transparency in gelatine for certain processes. Whether that is the case or not I very much hesitate to say—I leave those who make the statement to prove it—but if it is necessary you may sometimes get your transparency too weak. Now if you place it in a solution of permanganate of potash you will at once get an increase of density. You will see from the specimen before you that it gives a yellow color, what photographers usually call " non-actinic," though why they should do so puzzles me. If you go to France and talk about actinism, you mean heat, but in England the same term is applied to light. I do not see why photographers should not say " photographic light," and discard the word " actinic " altogether. There are no such things as " actinic " rays ; all rays of light are exactly the same, and it all depends upon what substance they fall, whether they show as light or heat or chemical action. The great fault at the present day is that we are so apt to take up a term irrationally and stick to it. I protested the other day against the phrase " new photography," as it is the old photography applied in a different way. But when once a wrong name gets attached to a phenomenon there is no end of mischief done.

The action of the permanganate of potash is simply that the organic matter decomposes the permanganate, and oxide of manganese is thrown down on the gelatine.

Now, I never feel as if any lecture is complete when dealing with light unless we introduce the spectrum. Of all beautiful things, including a beautiful face, the spectrum is the most beautiful ; it has no form and is void of artistic properties in many ways, but the coloring is to me an endless source of enjoyment. Here is a spectrum, and you will see that if we cause the beam of white light forming it to pass through a solution of the bichromate that all the blue and a good deal of the green are cut off. We may expect that the light which can decompose the bichromate is that which it absorbs. Practically speaking, gelatine absorbs very little light, and we are not in a position to say that it is sensitive to light at all. According to the doctrine of energy, what is absorbed by a substance must do work in that substance somehow or another ; and if it happens that the molecules of the body are readily decomposable, we have chemical action taking place in the substance. We know that the bichromate of potash is decomposed, and we may suppose that all those rays which are cut off will be chemically active. If we use the chromate of potash we find a rather different state of affairs, as you see now. The relative sensitiveness of the neutral salt and the bichromate is about one and a half to one.

I have now two slides to show you. The top figure on the first one shows the result obtained by coating a plate with gelatine and lampblack and exposing it through the glass to the spectrum; and the figure below is the result obtained by immersing a bromide plate in solution of bichromate of potash and also exposing through the back. I want you to notice that there seems to be a slight difference in the length of the spectrum; it seems as if the bichromated gelatino-bromide film was a little more sensitive to the green rays than the bichromated gelatine without any admixture. The second slide shows similar experiments with the chromate. We are bound to deduce from this experiment that it is a saving of time to adopt the carbon method of printing in the winter rather than printing with silver salts, as there are then plenty of green rays, whereas the blue rays are very largely quenched. As the blue rays are principally active in forming a silver print, it follows that the sensitiveness of a bichromate paper suffers less than does a paper coated with silver chloride at the time of year when the blue rays are at a minimum.

Captain W. de W. Abney, C.B., R.E., D.C.L.

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PHOTOGRAPHERS' ASSOCIATION OF AMERICA CONVENTION OF 1896.

THE selection of Celoron, on Chautauqua Lake, as the place for the photographers' convention was, indeed, a happy one. Chautauqua Lake is truly a garden spot, and Celoron is just the place for a convention of photographers. A magnificent hall with long galleries for the proper display of pictures, ample and excellent hotel accommodations, and a climate that cannot be excelled, combined to make this convention of the Photographers' Association of America the most notable one in its history. Perhaps never before have so many photographers attended a convention, and certainly never before have so much profit and pleasure been derived by them from a meeting of photographers. On June 21st trains arrived from all sections of the country, and by midday, on June 22d, one thousand photographers were ready for business. The first special train carried the New York and Philadelphia delegations, about one hundred and fifty strong. Following this came the train of the Chicago Chautauqua Club with a party of several hundred. Boston was represented by a party of seventy-five photographers, and special cars were run from St. Louis, Cincinnati and Detroit. One special feature was the number of ladies present, and there is no doubt that at next year's convention photographers will take their families, for a more delightful spot cannot be conceived.

The Convention hall at Celoron was admirably arranged, the exhibits of the manufacturers and dealers being distributed around the large room, with ample seating space for all in the center. The first day was devoted to a general informal reception at the hall, with promenade concert by an excellent band. The hall, being decorated with flags, flowers and plants, presented a very gay appearance, and one of the real objects of the Convention was realized on this first day, for soon all were very good friends.

On the second day, June 23d, the photographers were at the hall very early, and the exhibits of apparatus were thronged with seekers after the newest and latest appliances. A more representative body of photographers has probably never been brought together. At 11 o'clock President Bellsmith called the Convention to order, some twelve hundred people being in the hall. The President introduced the Hon. Porter Sheldon, who delivered the following address of welcome to the Association :

Mr. President, Ladies and Gentlemen of the Photographers' Association of America :

Old Chautauqua bids you a cordial welcome to her heights. Her great heart glows with warmth at your approach. She will inspire you all, never doubt it, with a generous rivalry to make the most and the best of this week's outing.

In the cool, calm mornings of her perfect June, when with even pulse and clear, searching eyes you address yourselves to the duties of your great association, seeking to realize and enforce that golden maxim, " Help ye one another," that renders so delightful the contact of kindred spirits striving for great excellence, her spirit will abide with you then.

When, released from the duties of the day, whether you devote the bright afternoons to the diversions of recreation or repose, old Chautauqua will be there to help.

To the more active her attentions may be a little warm, but, Mr. President, I assure you that, although these warm attentions may seem somewhat oppressive at the time, yet, like the hot summer evenings which you have spent in old Cincinnati with your best girl, they will be sweet to remember.

Then, ah ! her delicious nights, when she woos you beneath her silver moon, upon her rippling waters, and fans you with her coolest airs, she will be irresistible to you then.

But, Mr. President, I have a word of warning which I must speak to some of my youngest, most inexperienced friends here, like—yes, I will not be personal—like Charlie Hetherington, for instance.

Beware ! Beware ! Beware ! An evil spirit, disguised in a most seductive form, haunts these beautiful shores by the pale light of the moon. Beware, beware, beware, for—

The sweet sounds of the early morning,
  The bright sights of the sunny days,
Are only sweet when we fondly listen,
  Are only bright when we fondly gaze.

Now, how can you fondly listen to the sweet sounds of early morning or fondly gaze in the bright light if your little heads are swelled to bursting ?

Mr. President, and ladies and gentlemen, old Chautauqua gladly welcomes you, and wishes you the greatest possible profit and pleasure.

Mr. Sheldon's address was punctuated with applause and laughter, and the President expressed the feelings of the Association as follows:

Mr. Sheldon.—On behalf of the Photographers' Association of America I desire to honestly and earnestly thank you for your cheerful and warm words of welcome. From what we have already learned of you Chautauquans and of this place we are sure that the welcome is more than a formal speaking of the words; that it is no mere lip welcome; that the sentiment springs from the heart. And I assure you that we are as happy to be with you, as an association, as you are to see us here. Again, Mr. Sheldon, I thank you.

The roll-call and reading of the minutes being by unanimous consent omitted, the President's annual address was read by Mr. Bellsmith.

Ladies and Gentlemen of the Convention:

In addressing you briefly this morning I will not attempt any discussion of technical matters or theories in reference to photography, but will confine my remarks to suggestions for the advancement and improvement of our association and members of the craft generally.

You are congratulated upon the increased interest and greater usefulness of our organization. There is nothing like union and association to improve and advance us. The social features are of great advantage, but more than all, and above all, is the good that comes from conference among ourselves.

You rub off the rough edges, you forget the sharp competition; old sores are healed, new and lasting friendships are formed, and you learn only of what good you can accomplish.

While enjoying to the fullest extent the social features, do not neglect the great and lasting good to be derived from the careful, intelligent and thoughtful study of the photographic work entered for the prize competition.

I congratulate you upon the higher standing, both socially and as business men, which, as a body, photographers have attained; still there is room for improvement. In this connection there is one practice that is still maintained in the great majority of studios. I refer to the rather degrading custom of doing business on Sunday. We have all been more or less guilty, and I think this has interfered more than any one thing with our taking as a profession a higher standing in the community. I would suggest that this matter be given to a committee to report on some feasible way of promoting the proper observance of the Sabbath.

I feel it my duty to call to your attention a matter which is yearly becoming more embarrassing to the officers of this association, and on which I deem some action should be taken to insure success and equity at future conventions.

It must be apparent to you that convention halls, medals and prize trophies, entertainment and educational attractions and provisions, with the vast amount of details, correspondence and literature attendant, cost a considerable sum of money annually that membership fees of photographers will not begin to cover.

This expense is provided for by selling space to manufacturers and dealers for exhibition and educational privileges, and from subscriptions of dealers and manufacturers whose business is dependent upon their trade with photographers.

It would seem that manufacturers and dealers, basing their business upon their trade with photographers and gaining opportunity of meeting their trade at conventions, would be willing to do their *pro rata* share in defraying the expense of these meetings, and it would also seem a matter of equity that they should do so.

Unfortunately these are not the facts, and I am pained to state that the maintenance of our conventions has been dependent upon the generosity of a few manufacturers and dealers, who have been taxed way beyond an equitable basis, while the majority have been admitted to the full enjoyment of the trade advantages of the Convention without contributing a cent to the expense, save the admission fee at the door. This, to me, is not only manifestly unfair, but cannot go on with any safety to our organization, and I regard it that the time is not far distant when our generous and liberal friends will finally tire of this unjust tax upon them, which is not begrudged to the advantage of the photographer, but to the equal advantage of their competitors who feast at their expense. I, therefore, place this matter before you in its naked truth for your consideration, and would suggest that some legislation be enacted to place this matter on an equitable basis whereby a few of the manufacturers and dealers will not be called upon to defray the *per capita* tax of the many who enjoy equal privileges with them, and where, if a dealer or manufacturer be permitted on the floor of our convention halls, he will be obliged to defray his fair share of the privileges he enjoys.

We have here with us to-day concerns who have spent hundreds of dollars for the privileges we are enjoying, while others, without the expenditure of a cent aside from their admission fee, take equal prominence with them from a social and trade point of view. It is neither just nor equitable, and, like all things based upon similar standards, must sooner or later fail.

In somewhat lively contrast to this is the action of the local Entertainment Committee of the Detroit Convention of last year, who, having a surplus of some $242, most generously donated that amount to this association. I consider this very handsome, and it should not be allowed to pass unnoticed.

The matter of changing our constitution and by-laws has been agitated to some considerable extent since our last meeting, and that the time of the Convention be not taken up by too lengthy discussion bearing upon this subject to the exclusion of the regular order of business. I would suggest that a committee be appointed to take this matter under consideration, and that all questions under this head be referred to them for consideration.

One of the most fruitful causes for dissension and criticism in the past has been in the matter of the appointment and *personnel* of the judges of the exhibits competing for the prizes offered by this association. The system inaugurated by the Executive Committee of Territorial Divisions has offered a solution of our former difficulty whereby the very best talent in the profession is available. Under our present plan an exhibitor is eligible for the position of judge in any division excepting the one he is himself competing in.

In conclusion, permit me to commend the wisdom of your choice in selecting fair Chautauqua for the place of holding our convention, aside from the convenient and magnificent auditorium and art hall. The opportunity afforded for a delightful vacation is unsurpassed, and this spot should have our serious consideration as a place of future conventions. The manufacturers and dealers in photographic materials have most generously provided for your entertainment and recreation, no efforts having been spared to make this the most pleasant, profitable and successful convention in the history of our organization.

Mr. Jex Bardwell, of Detroit, spoke briefly, discussing stereoscopic photography, and finishing his remarks by advocating prizes for employees.

Mr. Edward L. Wilson spoke in behalf of funds for providing a home for Mr. Jex Bardwell, and a committee was afterwards appointed to see what could be done in this direction.

Mr. Abraham Bogardus spoke earnestly on the claims of photography to be considered as an art, and invited those who doubted it to go with him to the magnificent display of photographs in the annex.

Mr. Charles Hetherington, who had charge of the School of Photography, which was one of the features of the Convention, invited all present to attend the school and exchange ideas, pointing out that it was not a school of one professor and many scholars, but was a school where all should be teachers and all students. In the afternoon the School of Photography was opened by Mr. Hetherington, and details regarding the work done there will be found in another part of this issue. In the evening the dealers in photographic materials gave a lawn fête at Greenhurst, and a very enjoyable evening was spent.

On Wednesday, June 24th, despite a heavy storm, a very large number of photographers were present. A. L. Bowersox, of Dayton, O., reported for the Committee on the progress in photography, referring to the vast necessity still apparent for improvement in artistic photographic effects. Apparatus and appurtenances have seemingly reached the highest possible stage of perfection. The most needful thing, said the speaker, is to realize our art poverty, and to strive for higher attainments.

Mr. Edward L. Wilson made a plea for more thought in the practice of photography. A splendid effect is often ruined by a blot of light or inharmonious setting. It is high time that photographers should rouse from their lethargy and strive for the high place awaiting them. It will pay to think seriously on what we do. Photographers do not give the same thought to their work under the skylight as in the darkroom. Thought is a human motor. We must educate and train our minds according to the laws of thought. Proper thinking is the germ of the whole matter. Be intense and continuous in thought. Devote an hour each day to thinking on your work, and gradually increase the time. A marked change for the better will take place in your habits of thinking and work. You will grow in usefulness as you mature, adding fame to your work and money to your purse.

Mr. J. Ed. Rösch, of St. Louis, Mo., spoke on the importance of feeling in art. That man is the greatest artist who follows Nature. Art is born in the striving for something better. Photography should have a place in our institutions of learning.

George G. Rockwood, of New York, was called from the audience, and made a brief address on enlarging in photography, following the lines given in his admirable article in our June issue.

Mr. M. R. Hemperley, of Philadelphia, speaking on "Generalities," noted the improvements made in the art side of the photographer's calling. He testified to the great benefit he had derived from the P. A. of A. conventions, and made a plea for the establishment of an academy of photography.

In the evening the most successful event of the Convention occurred, this being a ball at the Waldmere, given by the demonstrators. Every one thoroughly entered into the spirit of the thing, and the large ballroom was crowded with merry-makers.

On Thursday morning the annual report of the Treasurer was read, showing a balance in the treasury of over $900. The President appointed as Nominating Committee, Messrs. Snyder, Root, Watson, Newell and Knaffl. Mr. Benjamin Larrimer, President of the Indiana State Association, cautioned those present against the danger of becoming simply convention photographers; that is, photographers who put forth their best efforts solely for convention exhibitions, their average run of work being poor. Mr. Larrimer's address was interspersed with much humor, and was heartily enjoyed.

Mr. John Schneider, of Columbus, discussed the art of photography, stating that the photographer of to-day is not satisfied with merely mechanical effect, but is reaching out after the beautiful. The camera is the most truthful portrayer, and it often sees the most stubborn individual. A photographic operator of all artists is the most dependent. The greater, therefore, is his triumph in success. One of the most important things is to make the subject feel in sympathy with the aims of the operator. Abandon, life, and feeling are the most important considerations in the general result.

Mr. E. B. Core, of Cincinnati, spoke on the subject of children. It is the strong, masterful, genial operator, who has the best success.

This is largely an accident of birth, but there is no doubt but that these qualities may be cultivated to a marked extent. Keep cool. Philosophically view your troubles, and if you cannot surmount them, go around them. There is a difference between a picture and a portrait. One is merely a record of facts, while the other is imbued with life and feeling. Good nature and patience, indispensable in the treatment of the adult, are equally so with children. Love should invite, not force rule.

Mr. J. Ed. Rösch remarked that it is essential that you make a friend of every customer who comes into your gallery. You should make an effort to maintain such relation with every customer. Greet them as if they were friends. This will be a greater source of revenue than almost any feature of your work. You cannot get a customer to smile unless you help him. Mr. Rösch invited American exhibitors to deposit with him three of their best pictures to be sent to the German Exhibition, and a committee was appointed for this object.

Mr. Dundas Todd, of Chicago, spoke on the progress of photography. To be successful in business a man must supply what is wanted. A wide-awake photographer is always on the outlook for novelties. A good business man buys as cheaply as he can and sells for the most favorable figure. He will not buy the cheapest because it is cheap. Cheap help, paper and chemicals are dear at any price. Can any man tell the cost to produce a dozen cabinets? Never expect to take out of a plate more than you put in it. Every photographer should have a system and live up to it.

In the evening the photographers and friends were invited to a moonlight excursion given by the manufacturers of photo supplies. Unfortunately the moon did not appear, and a heavy thunder storm somewhat marred the proceedings. A thoroughly enjoyable evening was spent, however, in spite of the storm, though the excellent programme laid out by the committee in charge could not be carried out. Three large steamers, each carrying about five hundred persons, were preceded by the flagship with Mr. Abbott in charge. A landing was made at Long Point, and a collation was served, while those of a more lively turn enjoyed a capital dance.

The Friday morning session was devoted largely to the election of officers, the final election resulting as follows: President, C. M. Hayes, Detroit, Mich.; First Vice-President, J. Will Kellmer, Hazelton, Pa.; Second Vice-President, W. J. Thuss, Tenn.; Treasurer, George Varney, Chicago, Ill.; Secretary, A. L. Bowersox, Dayton, O. The Secretary was directed to mail to each exhibitor the average markings of the judges on his exhibit.

Mr. J. Weil, of Chicago, read a paper on non-studio photography, advocating the taking of the pictures at the home of the patron rather than at the studio.

In the evening it was decided to meet again at Chautauqua in 1897, no other place being even mentioned. This was a high tribute to those having the 1896 Convention in charge. The awards of the judges in the various divisions were made known, the list being as follows:

JUDGES' AWARDS.

Eastern Division.—Genre, E. C. Dana. Class A, 1st, Pirie MacDonald; 2d, A. N. Camp; 3d, Gilbert & Bacon; 4th, H. H. Pierce. Class B, 1st, M. R. Hemperley; 2d, G. Nussbaumer; 3d, T. E. Walker; 4th, C. Horner. Class C, Hale. Class E, 1st, W. C. South; 2d, W. H. Rau; 3d, Whitney & Son; 4th, Pach Bros. Class F, 1st, John Rösch; 2d, G. E. Tingley; 3d, W. A. French, Class H, 1st, F. S. Olds; 2d, J. Betz, Jr.; 3d, Jackson. Class I, Pirie MacDonald.

Western Division.—Genre, Rösch Bros. Class A, 1st, J. C. Strauss; 2d, Rösch Bros.; 3d, J. A. Brush; 4th, W. Dole. Class B, 1st, R. Bellsmith; 2d, Webster; 3d, Dabbs. Class C, 1st, Aune; 2d, Curtis & Gupthil. Class D, Knowlton & Co. Classes E and F, no entries. Class G, 1st, Aune; 2d, Webster.

Southern Division.—Genre, Moses & Son. Class A, 1st, McCrary & Branson; 2d, Knaffl Bros.; 3d, Moses & Son; 4th, H. C. Hall. Class B, 1st, F. M. Somers; 2d, W. C. & H. I. Thuss; 3d, Mudge; 4th, P. P. Havens. Class C, Hoffman. Class E., 1st, Knaffl Bros.; 2d, P. P. Havens; 3d, McCrary & Branson. Class F, 1st, P. P. Havens; 2d, M. Mudge. Class H, McCrary & Branson. Class I, Homeier & Clarke.

Middle Division.—Genre, Baker Art Gallery, Class A, 1st, Morrison; 2d, Root; 3d, Baker; 4th, Decker. Class B, 1st, Arthur & Philbric; 2d, G. Sperry; 3d, Doyer & McLean; 4th, W. A. Pryor. Class C, 1st, Van Loo & Trost; 2d, Doyer & McLean; 3d, G. I. Weil. Class E, 1st, Mayo & Weed; 2d, McMichael; 3d, Allen & Fairjoy. Class G, 1st, Decker; 2d, George Smith; 3d, H. S. Klein. Class H, 1st, A. G. McMichael; 2d, L. C. Overpeck.

Grand prize in genre to Baker Art Gallery; grand prize in Class A to Pirie MacDonald.

A magnificent silver set was presented to Mr. Abbott as a slight recognition of his thoroughly earnest work in making the Convention such a great success. In the evening the American Aristotype Company entertained the visitors with an exhibition of fireworks at the ball ground at Celoron, and on the following day the majority of the delegates left for home.

THE SCHOOL OF PHOTOGRAPHY.

PROBABLY the feature that attracted to the greatest extent photographers to the Photographers' Association of America Convention was the School of Photography inaugurated by the American Aristotype Company, and under the direct charge of Mr. Hetherington. The attendance at every session was very large, reaching sometimes one thousand. A slant skylight had been built in the wall of the schoolroom, and every facility for demonstrating the production of various effects in lighting and the treatment of difficult subjects was at hand. Questions were asked and answered, subjects were posed and photographed, and demonstrations in toning were given. Some of the hints given were jotted down, and we present them herewith to our readers:

It is better to cut down the light and increase the exposure than to use a reflector to light the shadow side.

In photographing a long face, remember that a side view makes it appear longer, whereas a view of the full face, taking in a portion of the ear, broadens the face and produces apparent shortening.

In cases where the subject has a lump on the nose, apply color, so that the light will not catch it.

Strauss modeler is an excellent thing for subduing too intense high lights.

Always have a small table with Strauss modeler and a box of water-colors on it, for a great deal can be done to the subject before the exposure is made that will greatly enhance the resulting picture.

In cases of high cheek bones, remove the high light with the modeler.

Where one eyebrow is much stronger than the other, take a little water-color and darken the brow. It is well to do these things before taking the negative, if for no other reason than that the customer will think you are devoting considerable attention to him for his benefit.

In cases of drooping eyelid, get the subject to look down, and touch the eyelid with a match covered with gum arabic; when the eyelid is raised it will stick, and the droop is thus overcome.

Some people when sitting for pictures look like a bag of bran, all huddled up. Take such figures standing up.

Very corpulent people should sit well back in the chair, not on the front of the chair, and should lean forward.

In photographing light draperies, have the light come from the back, and the shadows will then be in front and not behind.

Operating is principally balancing the light.

Have wide operating rooms.

When photographing a white beard, dust on some Strauss modeler, so that the whiskers will not be overtimed.

Never pose the hands so as to show as a square block. The feet should be covered up as much as possible, and should always be taken so as to be very shortened.

Never use a white reflector; have it a light gray and of large size.

Study light everywhere; in the car, in the street and in the church.

Many pictures lack action, meaning, sentiment and life.

With subjects that have sunken eyes, take them further from the light; for, if near the light, the top light will throw shadows.

Never photograph red hair without powdering it.

Use portrait lenses for portrait work.

The developer that some operators will swear by, others will swear at.

Subordinate the accessories to the figure. Let the story be first.

* * *

The Bristol (Eng.) International Photographic Exhibition will be held at the galleries of The Academy of Arts, from December 14, 1896, to January 23, 1897. Medals will be awarded for landscapes, marines, architecture, portraiture, genre work, enlargements, transparencies, scientific photography, heliochrome, and other process work, and for apparatus. No picture having previously gained an award will be admitted, except in the champion class. All communications must be addressed to Mr. M. Lavington, 20 Berkeley Square, Clifton, Bristol, England; and all exhibits must be sent, carriage prepaid, to arrive not later than December 1, 1896.

We have half a dozen entry blanks, and will be pleased to send them to any of our readers who contemplate exhibiting.

PROCESS WORK

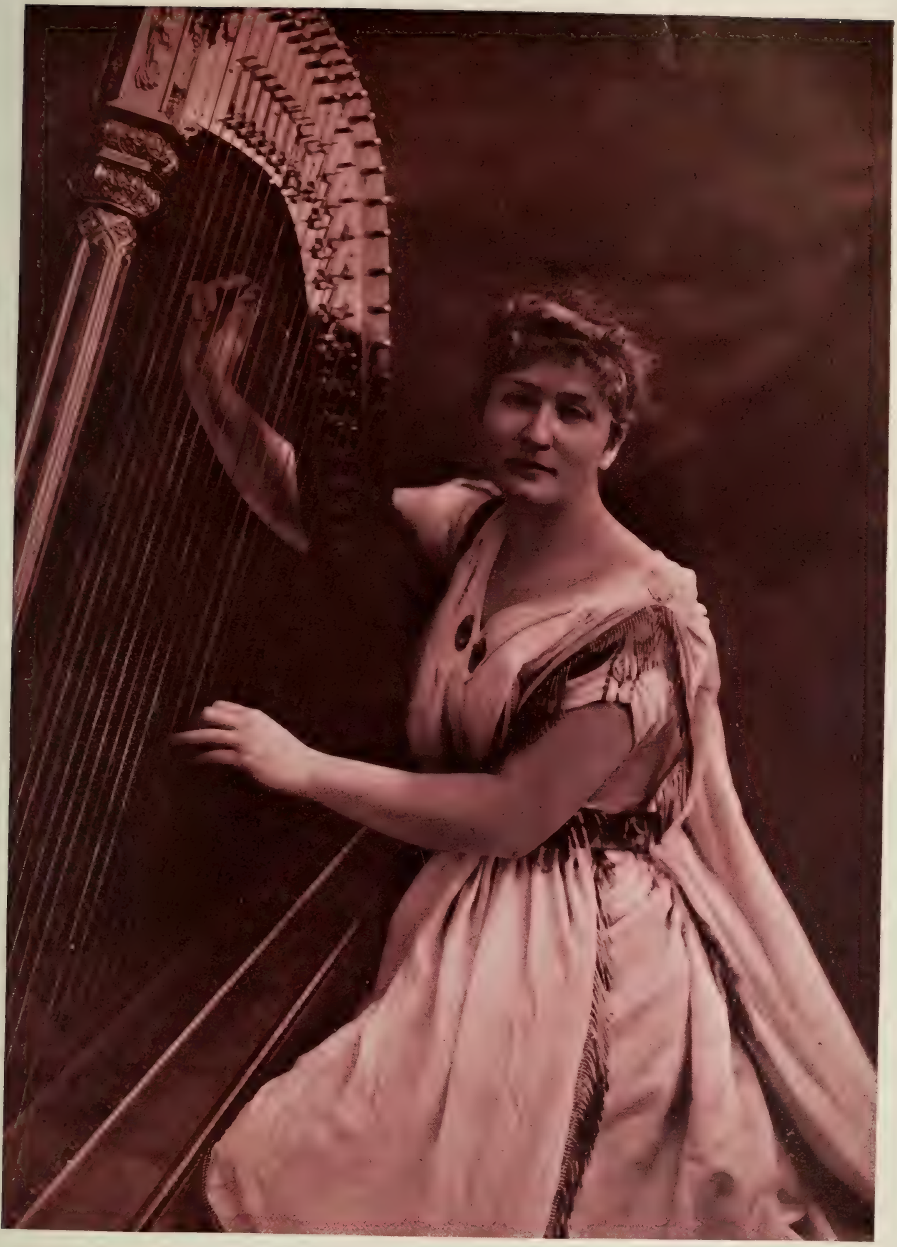
By Stephen H. Horgan.

THE PROFITABLE STUDY OF FORMULAS.

IT was intended to publish in this department, this month, some formulas to show how they could be profitably studied if arranged in comparative tables. By a strange coincidence our exceedingly valuable London contemporary, *Process Work and the Printer*, has a leading article on this very subject, which presents the matter so much more clearly than we could have done that it is given here. The comparative tables of enamel and lithographic ink formulas are examples of the tables we had prepared, the others being omitted for want of space.

"It is commonly said of trade handbooks that they are of little value, and it is invariably suggested that the author is either keeping back something, or does not know sufficient about his subject. For our own part we consider that no book is so thoroughly bad but that it contains something to justify its existence, and make it worth buying. We would recommend young workers in all trades to read every book they can get hold of bearing on their particular craft, but at the same time we must impress the necessity of digesting the information. To get the best value out of a number of books on the same subject, one must analyse the opinions of each author and compare their formulas. By noting wherein they differ is the point where the reader begins to learn. Yet how few take the trouble to do this. It may be that the formula from some particular book is simply taken as it stands, made up, and tried. If not right first trial or so it is discarded, and another book appealed to. This shares the same fate, perhaps, and so the experimenter goes on, trying one thing after another until he gets to the end of his tether. Then he cries out against trade handbooks, and wonders how other people get their information. A little system would have saved him all the worry and waste of time and chemicals. Let us suggest a way: Suppose an operator wants to know the best formula for iron development of wet plate, and has only his books to guide him. Take a sheet of foolscap and rule it with as many columns as there are likely to be ingredients in such a developer. Write in the margin the name of the author; at the top of each column the names of the various ingredients, and calculate the quantities for an equal amount of water in each case. The result will be a table as shown on the next page.

"Now let us see wherein these authorities differ. Practically they do not disagree in any essential point. Take the primary ingredient, the sulphate of iron in the first column. Captain Abney gives 2 ounces of iron in the first formula. We might have selected a formula, among several in his handbook, giving a less amount of iron, but the above will illustrate better our remarks. Captain Abney says: 'The stronger the iron solution, the greater chemical power it will have, and the more rapidly it will decompose the silver solution. Consequently, with a strong solution, all parts of the picture acted upon by light will immediately become nuclei for the deposition of silver, and the deposit will be of more even density than if a weaker



MAUD MORGAN.

NEGATIVE ON CLIMAX PLATE BY
BY DAVIS & SANFORD, NEW YORK.

HALF-TONE AND PRINTING AT THE
SCHOOL OF PRACTICAL PROCESS ENGRAVING.

solution had been employed; for with the latter those parts most acted upon by the light having the most attractive force would draw the deposit of silver to them, and the image would be much more intense at those parts than where the light had less strongly acted.'

"It follows from this opinion that for the hard black and white negatives required for process work a developing solution weaker in iron is requisite, and it is thus obvious why most of the photo-mechanical authors advise less iron. Where saturated solutions are stated, an exact comparison is impossible, though 1 part of sulphate of iron is known to be soluble in 1½ parts of water; such formulas are as a rule to be avoided.

COMPARATIVE TABLE OF DEVELOPERS.

AUTHOR.	Sulphate of Iron.	Acetic Acid.	Alcohol.	Sulphate of Copper.	Water.
	Ounces.	Ounces.	Ounces.	Ounces.	Ounces.
Abney	2	1	q. s.	....	20
"	1	1	q. s.	½	20
Br. Jl. Almanac	1	1	1	....	20
"	½	¾	½	90 grs.	20
Wilkinson	1	¾	1	....	20
Schraubstadter	1¼	2½	1¼	....	20
Verfasser	1	1	1	....	20
Farquhar	4 s.s.	4	1	½ s.s.	20
Anderson	1¼	1¼	....	....	20
Whittet	10 s.s.	1½	....	....	20

s.s.—Saturated solution. *q.s.*—Quant. suff.

"It should be noted that where the iron is above or below the normal 1 to 20 the amount of acetic acid is reduced or increased, and this brings us to the consideration of the part which acid plays in the development. We again quote Captain Abney, who says: 'In the formulas for developers it will be noticed that the addition of acetic acid is always included. If to a solution of pure ferrous sulphate a solution of silver nitrate be added, there will be an almost instantaneous deposit of metallic silver. If, therefore, the former solution were flowed over an exposed plate which had free nitrate of silver on it, an immediate precipitation of silver would take place all over the film. With an acidified solution, however, the deposition would take place with greater regularity and less rapidity. In practice, the acid added is just sufficient to regulate this reduction of the silver. Not only is acetic acid effective, but nitric acid, sulphuric acid, citric acid, and in fact most of the organic acids. Acetic acid is selected on account of its mild restraining power and a consequent finer deposit. Since heat increases the rapidity of chemical action, it follows that a larger quantity of acetic acid must be used in decidedly hot than in cold weather.'

"Turning to the third column it will be noticed that the alcohol is stated *quant. suff.*, and in some cases left out, while in others it varies. We suppose, however, that every operator knows that alcohol takes no part in the formation of the image, but is simply to make the developer flow on the plate when the silver solution becomes impregnated with alcohol and ether from the collodion plates dipped into it. When the bath is new the developer need have no addition of alcohol, but as it becomes older a sufficient quantity of alcohol must be added to cause the developer to flow without repulsion. Captain Abney says that 15 to 20 minims per ounce of water will generally be the quantity required.

"The addition of sulphate of copper to the developer is of doubtful advantage, and a complication in the formula. In the old wet plate days a developer containing it used to be prepared by some photographers for landscape work, and was said to give clear and brilliant images while shortening the exposures.

“From our own experience, borne out by a consideration of various formulas of English and foreign workers, we can recommend as a good standard developer, for wet collodion, the following:

Sulphate of iron	1 ounce.
Acetic acid	1 “
Alcohol	1 “
Water	20 ounces.

“If this does not bring up the image, depend upon it something else but the developer is at fault.”

ENAMEL FORMULAS.

AUTHOR.	Albumen.	Le Page's Glue.	Water.	Bichromate Ammonia	Gum Acacia.	Chrome Alum.	Aqua Ammonia.
	Ozs.	Ozs.	Ozs.	Grs.	Ozs.	Grs.	
Inland Printer	2	5	6	130	....	....	½ drachm.
H. J. Lloyd	⅓	1½	6	40	¼	....	1 “
H. Jenkins	3¾	3¾	6	105	....	....	A few drops.
S. H. Horgan	1	2	5	120	....	3	15 drops.

LITHOGRAPHIC INK.

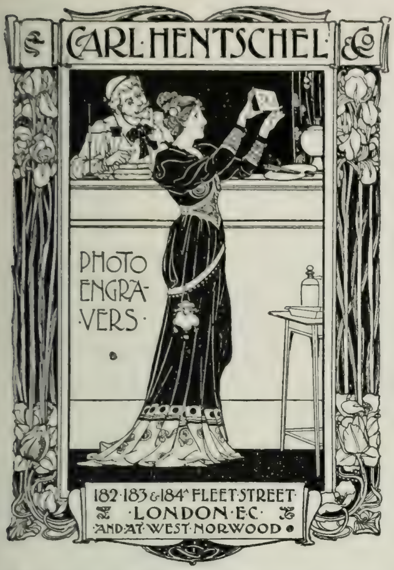
AUTHOR.	Lith. Printing Ink.	Chalk Litho. Ink.	Lampblack.	Gum Shellac.	Burgundy Pitch.	Palm Oil	White wax.	Resin.	Linseed Oil Varnish.	Mutton Suet.	Bitumen.	Castile Soap.	Oil Turpentine.	Gum Mastic.
Sir Henry James	..	32	..	..	4	2	2	..	16	..	..	..	..	..
Sir Henry James	8	..	..	..	4	½	½	..	4	..	..	..	..	..
Fortier	..	..	3½	..	..	..	4	..	4½	½	..	..	½	¼
Abney	16	..	..	..	6	1	1	..	8	..	2	..	..	
Herr Husnik	20	..	30	..	..	..	50	35	..	40	..	..	200	Black Pitch.
Transfer ink	..	..	1	4	8	..	8	..	..	8	..	4	8	
For zinc etching	..	..	..	..	½	..	2	..	..	..	2	..	..	½
Good etching ink	..	..	2	..	1	..	1	1	3	2	..	..	1	..

FORMULA THAT IS UNIVERSAL.

THE quality of sunlight, range of temperature, degrees of moisture, will vary in different lands and affect process work and its result. But there are conditions in this business when the procedure of the operator is the same the world over. A few of these are told in *Process Work and the Printer*, of London, as follows: “When a man makes a twenty-minutes' exposure for a half-tone negative without drawing the shutter, he says the same thing as when he drops his Levy screen on the floor, or takes up an enamel plate laid out for cooling after the burning-in process. In either case the remark is usually unfit for publication.”

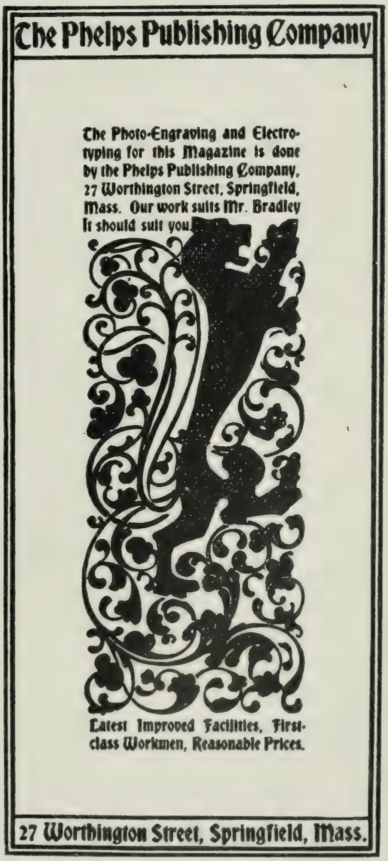
“Who invented the enamel process?” is often asked, but remains as unanswerable as the question, “Who struck Billy Patterson?” Mr. F. E. Ives, to the surprise of everybody, and with unusual modesty, disclaims the honor. Now, won't the real inventor please step forward and receive his laurel wreath?

ART IN PHOTO-ENGRAVERS' ADVERTISING.



First Prize—"Iris," Robert Hope, 34 St. Andrew's-square, Edinburgh.

The criticism in these pages of the exceeding vulgarity of some of the subjects selected occasionally by photo-engraving concerns in their advertisements seems to have awakened them to a better sense of what is appropriate for journals taken to one's library table. It is with pleasure, therefore, that we present two current designs very much reduced from their original sizes. The one for Messrs. Carl Hentschel & Company took the first prize of £25 in a competition, and is now being reproduced in so many magazines that these enterprising engravers are reaping the benefit of sufficient gratuitous advertising to repay them many times for their outlay in the competition. The artist of this chaste design is Mr. Robert Hope, of Edinburgh. The Phelps Publishing Company design is a page from "Bradley, His Book," and, though not signed, shows the genius of the designer, Bradley. It was printed in olive-green ink with the rampant grotesque animal in red. The effect was as striking as was the intention of the designer. Photo-engravers have it in their power to set the style for much of the art in advertising.



The Phelps Publishing Company

The Photo-Engraving and Electrotyping for this Magazine is done by the Phelps Publishing Company, 27 Worthington Street, Springfield, Mass. Our work suits Mr. Bradley It should suit you.

Latest Improved Facilities, First-class Workmen, Reasonable Prices.

27 Worthington Street, Springfield, Mass.

Mr. H. Whetton, editor of *The British Printer*, in an article on "American *versus* British Printing," in the "Process Year Book," says: "As regards the printing from half-tone blocks, here we confess the Americans lead. But it must be remembered their work represents the results of several years' start on British work."

A few copies of "Process Year Book" may be obtained from our publishers. This book is of unusual excellence and should be seen by every engraver.

THE PRINCIPLE OF THE HALF-TONE IMAGE.

Our usually erudite contemporary, the *British Journal of Photography* grapples with the principle of the half-tone image, and though it announces in the first paragraph that the matter is "thoroughly understood," it will be remarked that it gets all tangled up, as even Mr. Levy himself has on this subject, and inadvertently admits, in the next paragraph, how difficult it is to understand this question, after all.

In its leading editorial of April 10th it says :

> "It was not until within the last very few years that the principle of the half-tone screen as at present employed began to be studied, and still more recently to be thoroughly understood ; and even at the present time, judging by the different opinions expressed, it seems to be open to doubt still whether the diffraction, the pinhole image, or the vignetted theory, is the correct one. It is true that among the upholders of the diffraction theory are some of the most practical men of the present day, including Mr. Max Levy, to whom we are indebted for the perfection of our modern screens ; but, although diffraction undoubtedly forms a most powerful factor in modifying the character of the dot obtainable on the photographic plate, it is still questionable whether its influence is very great under actual working conditions. A careful examination of Max Levy's examples of undoubted diffraction and of actual negatives used in half-tone printing will go far to strengthen this doubt, whereas the pinhole-image theory fits in almost completely with all the effects obtained in real practice under any of the working conditions of stop, screen distance and camera extension.
>
> "But there is such a strong tendency, nowadays, to resort to complications in the shape of irregular and multiple apertured stops, that it is quite impossible to say how much of the effect is due to diffraction and how much to the combined influence of screen and stop ; and it is almost equally difficult to work out, except by accident, the proper working conditions for any combination of circumstances."

PROCESS NOTES FROM ABROAD.

Penrose & Company are about to issue a booklet containing tables showing the correct screen distance in half-tone negative-making. These tables are published in their valuable "Process Year Book," of which Messrs. E. &. H. T. Anthony & Company are the agents.

* * *

Dr. Joly now makes his lined color screens, it is said, by embedding colored silk fibers in the varnished coating of a thin plate glass.

* * *

M. Léon Vidal, professor at the Natural School of Decorative Arts, Paris, says : "France seems to be behind, compared with certain other nations, in the matter of photo-mechanical processes," and he then refers to the excellent half-tone illustrations in Anthony's Photographic Bulletin, among others, to demonstrate the superiority of American over French publications of the same class.

* * *

Foreign workers seem to succeed as well with zinc as copper for half-tone etching.

* * *

The bitumen method of sensitizing metal plates dies hard in Europe. One defender of it writes : "What if the printing of a bitumen plate requires one hour in the sun; you can be doing something else while it is printing. With enamel or albumen as sensitizers, they print so quickly you have to waste five minutes waiting for them to print."

* * *

MACHINE engraving is being used in England to lighten up skies and various portions of half-tone blocks. The effects are good. Why not use machines here?

* * *

MR. E. SANGER SHEPHERD'S grain-screen blocks are being boomed on the other side for use in color work. It must be admitted that the results are not as effective as they would be made with the lined screens.

* * *

To fix pencil drawings, use an atomizer and spray skimmed milk over them. On drying they will be found as permanent as if covered in the same way with the ordinary fixer.

* * *

POWDERED magnesia dusted with a tuft of cotton on the yellow and red inks dries them quickly, so as to permit rapid proving in tri-color printing.

* * *

HERE is a compliment to American half-tone work: Mr. Arkel, of *Judge*, told me recently that he has been approached by the publisher of *Black and White* with a request that he superintend the making of their half-tone plates in this country. This publication is one of the finest of the English illustrated weeklies, and their willingness to forward drawings across the Atlantic that the photo-engraving may be done here and shipped to them is another indication that we lead the world in half-tone block making.

COMPARATIVE STUDY OF PROCESS WORK.

NOT the least valuable feature of the "Process Year Book" is the opportunity of studying the work of the leading photo-engravers of England. There are no less than thirty-six of them represented in the book, as follows:

Swan Electric Engraving Company; Waterloo & Sons; Strand Engraving Company; Acme Tone Engraving Company; Lascelles & Company; Hawkes Brothers & Leonard; Sprague & Company; F. Plummer & Company; Direct Photo-Engraving Company; Vincent & Blaikley; H. G. Harold; Heliochrome Company; Duncan C. Dallas; W. C. Keene: Vaus & Crampton; Garratt & Walsh; A. Bourne & Company; Carl Hentschel & Company; W. Cronenberg; Bushey Process Company; Thomas Huson; E. Sanger Shepherd; Hare & Company; A. Brothers & Company; Frederick Donner; Carl Hauser & Company; W. & J. R. Cheshire; F. Godfrey Cole; The Arthur Cox Illustrating Company; The Meisenbach Company; Rothesay Collotype Company; Gilling Walpole Engraving Company; Dellagana &

Company; William Allen & Company; Cunningham & Company, and Morgan & Kidd.

Besides C. Angerer & Goschl, of Vienna; Husnik & Hausler, of Prague; S. W. Bacon, of Geneva; T. & R. Annan & Sons, of Glasgow; The Chemigraph Company of St. Louis; Levy & Company, Philadelphia; M. Wolfe, Dayton, O., and Stevenson & Ogilvie, Edinburgh.

A FEW MORDANTS WORTH KNOWING.

To etch aluminum:

Alcohol	4	ounces.
Acetic acid	6	"
Butter of antimony	4	"
Water	40	"

For brass, use:

Alcohol	4	ounces.
Chromic acid	4	"
Water	40	"

To etch lead:

Alcohol	4	ounces.
Bichloride of tin	2½	"
Water	40	"

A PHOTO-ENGRAVER'S PROTEST.

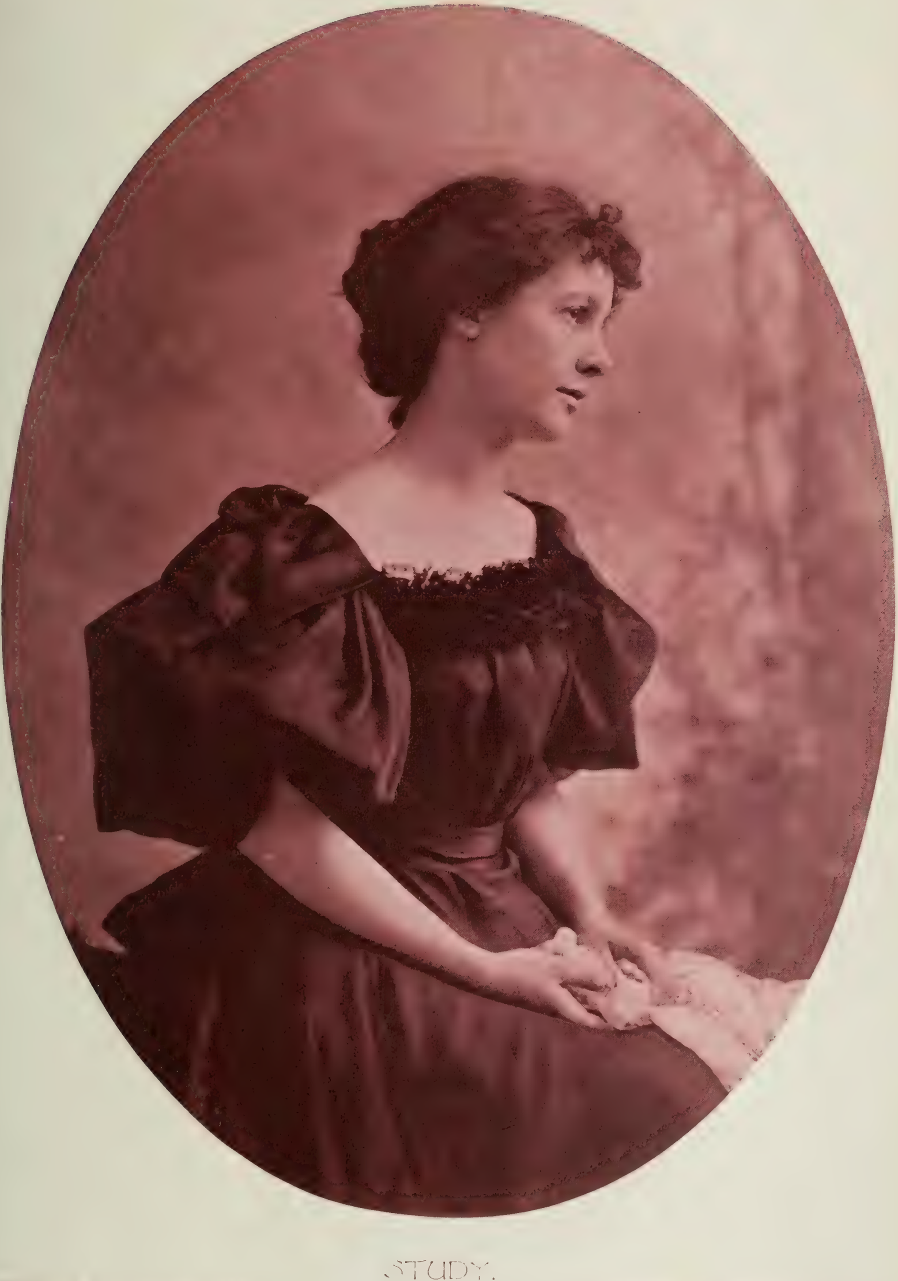
Mr. Alfred Stieglitz, the artist, gives in the June number of *The Practical Process Worker*, two illustrations of the same subject purporting to show the difference between a half-tone reproduction without hand work, and the same with wood-cut finish. He lays the blame for the mutilation of the block, given as a horrible example, to what he terms the "shoemaker" engraver's work. The fact was, however, that there was no wood-engraved finish on the figure that he complains about. The picture was ruined by an artist working up the photograph before it was photo-engraved. We photo-engravers have sufficient sins to answer for without taking the blame for Mr. Stieglitz's brother artists' doings. Further, it is an everyday occurrence for some of us to be called to account by artists for our lack of judgment, which is a further reason for resenting this unjust charge.

PHOTO-ENGRAVERS' UNION No. 1 OF NEW YORK.

The Photo-Engravers' Union of New York, is slowly, but surely, bettering the position of process workers. The scale of wages which it has adopted, $21 per week for day work, and $24 per week for night work, is being gradually introduced into the newspapers. When the scale of wages becomes uniform in all offices there cannot be the suicidal price-cutting that has prevailed in the business.

◆

The St. Louis Photo-Engravers' Association have held their first annual banquet, after which the following officers were elected: President, Lon Sanders; Vice-President, J. F. Ahle; Treasurer, W. A. Stecher; Secretary, Geo. Strassburger.



STUDY.

Negative on Climax Plate
by Davis & Sanford, New York.

Half-tone and Printing at the
School of Practical Process Engraving.

PROCESS APPLICATIONS OF THE BICHROMATE SALTS.

In negative making, the salts of silver reign supreme, but in process work the bichromate salts are king, *i. e.*, so far as getting the image upon the metal is concerned, or in fact in preparing any kind of a photo-mechanical printing surface. The bichromate salts most used and most useful are those of potassium and of ammonium; the bichromate of soda has been advocated, but it is of such a hygroscopic nature, that it is more or less a failure when used to sensitize any of the colloid bodies, which in themselves are far too susceptible to what may be termed the most serious trouble met with in working a colloid body, viz., damp ; therefore to use as a sensitizer a substance that is deliquescent is to court failure, and it usually comes; in no method can sodium bichromate be used with anything approaching practical success.

The potassium salt is the one most universally used, especially for collotype and photo-lithography, and in fact in any process where gelatine forms the ink-bearing surface and where it is not required to dissolve away those part not acted upon by light.

The ammonium salt is best when used with colloids which are soluble in cold water, and which have to be dissolved away to form the whites, as in photo-zincography.

The reason of this difference is because, when the potassium salt is used, spontaneous insolubility commences as soon as the gelatine is dry, and this is an advantage in collotype and in photo-litho, but not when using the soluble colloids necessary for photo-zincography, for which albumen, gum tragacanth, gum senegal, fish-glue, etc., are used; the ammonia salt allows more time to elapse between sensitizing and development, it not being so susceptible to damp, consequently is not so liable to cause insolubility without light action like the potassium salt. To ensure success in all processes where bichromate salts are used (especially potassium) great care must be taken to avoid damp ; this is one of the reasons why collotype has such a name for uncertainty; a little insolubility in a collotype film is of no moment, so long as the power of absorbing water is not restricted, as directly that point is reached, then trouble begins, the ink adhering to the whites as well as the darks, this process depending so much upon the discriminating power of absorbing water in sufficient quantity to give half-tones as well as lights, which is destroyed when the action of moisture is allowed to set up spontaneous insolubility.

Photo-mechanical methods may be classified into three groups, the first of which is photo-lithography; in this there are two branches, viz., line and half-tone, the function of photography being to produce a print or transfer by the aid of which the lithographer prepares the printing surface. In collotype the photographer produces the actual printing surface, from which the prints are made in a very similar manner to which lithographic prints are produced.

The second group embraces relief blocks for printing with type in line or in tone, the photographer producing the image on either copper or zinc, leaving the etcher to bite into relief; these methods are called zincography, but there are other methods of producing type blocks by the aid of light, viz., the swelled gelatine and the washed-out method in which a gelatine relief is made, from which plaster casts can be made, and from these blocks by electrotyping.

The third group is that of the intaglio methods, known better as photogravure; here the bichromate salts are put to use in every method, the rival processes varying in detail in the method of obtaining the grain, *i. e.*, the power of holding the printing ink in due gradation to form the picture.

The first and second of these groups were treated of last week, but it will, perhaps, be useful to recapitulate a little and give a few points as to failures and their remedies. In photo-litho in line a perfect transfer must be as follows : the lines must be perfectly firm and free from rottenness, the ink forming the image must be hard and free from any tendency to spread, and as little as possible should be used; the whites must be quite clean, the gelatine coating must be quite insoluble, but its absorbent qualities must not be interfered with; it must retain unimpaired its adhesiveness, else the transfer will slur when the attempt is made to transfer the ink image to the lithographic stone.

For photo-litho transfers in half-tone the smooth gradations of the photograph must be broken up by the discriminating reticulation of gelatine, prepared in a special manner for this purpose; there is no process yielding such uniform results as the process of Pretsch, and of which I will here interpolate the formula and its method of compounding.

First of all the gelatine is a very important item; it must be of a very soft variety, as may be understood when the maximum of reticulation is required. I generally use Kreutz's soft, and mix it with a little fish-glue in order to accentuate the grain.

No. 1.

Kreutz's soft gelatine	50 grams.
Clarified fish-glue	15 "
Water, 7 drams	200 cubic centimeters.

Soak the gelatine in the cold water till it is perfectly soft, then melt, add the fish-glue, and stir until it is also dissolved. *Note.*—Be sure and do not raise the temperature of water in pan over 55 degrees Cent. (130 degrees Fahr.).

Now prepare the following:

No. 2.

Ammonium bichromate	4 grams.
Water	100 cubic centimeters.

No. 3.

Silver nitrate	2 grams.
Water	100 cubic centimeters.

No. 4.

Calcium chloride (crystals)	1 gram.
Water	20 cubic centimeters.

To No. 1 add No. 2, using a stirring rod vigorously; next add No. 3, stirring vigorously all the time; the mixture will now be of a red color from the chromate of silver. Now add sufficient of No. 4 to just discharge the red color and turn the mixture white. Now stir in 8 drops of acetic acid, then 10 of glycerine; strain through muslin, and coat collotype plates which have been previously coated with substratum of beer and silicate, and warmed in the collotype oven, putting on the plate not more than 6 minims of the above for each square inch of surface to be coated dry at a temperature not exceeding 55 degrees Cent. (130 degrees Fahr.).

When dry, expose to light under a reversed negative until all details can be seen on back of plate, then plunge into a warm saturated solution of borax, then wash in clean cold water for three or four hours, then dry. When dry etch up and print from it in the same way as from an ordinary collotype plate, using transfer ink mixed with collotype printing ink, and pulling the transfers upon a good Scotch transfer paper which has been well rolled, and which is a little hard from age. These transfers are put down upon extra smooth stones in the ordinary way.

Passing onwards to photo-zincography for printing on the metal, there is nothing so satisfactory as the bichromated albumen, the ammonium salt being preferred as sensitizer, for half-tone. The same can be and is very largely used, but the best is either fish-glue or gum senegal and albumen, the image being subsequently carbonized in order to confer acid resisting powers.

Collotype has got at present a bad name, but to my thinking there is no justification for it, because, if the process be worked carefully and intelligently, it is quite as certain as any other photographic method in which a colloid is used. First of all, the plate must be clean and the substratum perfect. Good beer and soluble silicate used with careful and thorough rinsing after drying; the oven must be well ventilated, so that the sensitive film is dried, not baked ; the gelatine used must be hard, and if not hard enough should be hardened by the addition of spirits of wine. The bichromate used must be potassium, as this sensitizer does not solarize ; consequently the shadows are amenable to the etcher. The quantity of gelatine mixture put on the plate must not exceed 5 minims per square inch, taking the average strength of gelatine mixture at 50 grains per ounce of water, and, finally, the greatest precautions must be taken to guard against damp touching the film between drying and washing out of the bichromate.

Collotype in England is not so good as it ought to be, because the photographic part of the work is starved ; unskilled men are put to do difficult work, and unsuitable premises are used, and the consequence is that the work produced is so bad that the process is discarded as impracticable. It is sometimes said, too, that collotype is not suitable for three-color work ; but this is not my experience, and the prints which I pass round will show, I think, that it is very well adapted for three-color work.

The third group, comprising photogravure, like all the rest, has many modifications, which is not to be wondered at when it is remembered that it dates from 1852.

FOX TALBOT'S PHOTO-ENGRAVING PROCESS.

This method was patented in 1852, and consisted in coating a steel plate with bichromated gelatine. When dry this is exposed to light under a transparency. After exposure the plate is soaked in a mixture of sulphuric acid and vinegar. In this those parts of the gelatine not acted upon by light are washed away, leaving a half-tone negative upon the metal ; the plate is etched in a solution of platinum bichloride.

At the same time Mr. Fox Talbot patented the first method of obtaining a grain for obtaining half-tones. This was by first exposing the film of bichromated gelatine to light under a piece of gauze, following this by exposure under a half-tone negative.

In 1858 Talbot patented the use of powdered resin for the production of a grain. This was done by dusting over a film of bichromated gelatine, after exposure to light under a half-tone negative, with powdered resin, this resin being afterwards melted, the etching being done with perchloride of iron.

The modern methods of photogravure differ from this in having the ground put on before the sensitive gelatine, or in the case of the Klic method, of the exposed film of carbon tissue.

En passant, for photogravure, the finest results are obtained by first coating the metal with a solution of fish-glue, bichromated fish-glue, drying, then exposing to light under a ruled screen of from two hundred to three hundred lines to the inch, single ruling only. After exposure to light the film is developed in cold water colored with aniline, washed, dried and burnt in. On this ground either a carbon negative print is mounted and developed, or a thin film of gelatine is used, say—

Soft gelatine	30	grains.
Potass. bichrom.	7½	"
Water	1	ounce.

This should be spread on a whirler, drying face up, over a spirit lamp.

I find after many careful experiments that gelatine will, on an average, take 25 per cent. of its own weight of bichromate of potash without its crystallizing out, and of ammonium bichromate about 50 per cent.

Another method of photogravure is by dusting a Woodbury relief with powdered glass, or incorporating it or some such substance with the bichromated gelatine when dry. After development, a cast is taken, and from that an electro made.

Another method is that of Waterhouse, in which a Woodbury relief or a print in carbon, developed on a copper plate, is dusted over with fine sand previously waxed. This sand produces pits in the film. The film being dried, the sand is dusted off, and a grained image remains, from which a copper printing plate is produced by electrolysis.

Mr. Foxlee patented a process in which powdered resin was dusted over the gelatinous image, and when dry this resin was dissolved out by a suitable solvent.

In Mr. Sawyer's process plumbago in powder was introduced into a carbon tissue, which was sensitized in bichromate, and, after development, the print was used for electrotyping from.

From the foregoing it will be seen that in every one of the practical, and even the non-practical, photo process methods the bichromate salts are the most useful salts we have, and their usefulness extends into the domains of the silver salts, and gives us the only really permanent solar printing process, viz., the Woodburytype process. Even the carbon process, to many people, is more dependable in its permanency than the platinum process, and certainly beats it in variety of result and in ease of working.

At present the one drawback to the bichromate salts lies in the spontaneous action which is so similar in its action to that of actinic light. If that fault could be overcome or minimized, those salts would be perfect as sensitizers.

I am now able to show you a new application of photography in connection with the bichromate salts in the production of rollers for calico printing and embossing velvets and wall papers, etc. I pass round for inspection a portion of a roller such as is ordinarily used for the work, with the pattern in intaglio, and also specimens of calico and velvet, printed and embossed by means of rollers produced by a photographic method, photo-lithographic transfers being transferred to the roller, and then etched, the ink acting as a resist. I have been engaged on this process for the past two years, and this is the first time it has been publicly referred to. Rollers can be produced by it very much quicker and cheaper than by the usual method.

In conclusion, I would say that no matter how perfect the bichromate methods may be, or how easy and simple to work, no success can be attained unless the negative is suitable. Each method treated of in this series of lectures requires its own particular negative, and whether our dear old friend, wet collodion, or the newer love, gelatine, be used, make the negative for the process; do not try and make the process fit the negative.

W. T. Wilkinson.

WOODBURY PRINTING.*

This process, which has obtained its name from that of its inventor and founder, the late Mr. W. B. Woodbury, has now been before the public for a period of about thirty years, and it is generally admitted to be the most interesting and beautiful of all photo-mechanical processes. It was patented in the year 1864, and it is curious to note that the details of the process then protected are practically the same as the working to-day, showing that the genius of the inventor covered the whole ground, and that it has not been found possible since to discover any material modification which would affect the results obtained. Of course, there have been variations adopted from time to time, one of which, Woodbury gravure, I shall have a word to say about later on; but as regards the invention itself, Woodbury printing of to-day is almost precisely what it was twenty years ago; and it is singular in this respect: other photo-mechanical processes have been improved and advanced during the same period out of all knowledge, yet with this one the inventive genius of its founder was such as to leave scarcely a point unprovided for, and with a completeness that must always be looked upon with wonder and admiration.

You have had several lectures already in the present series dealing with the principles and phenomena of printing with gelatine and bichromate salts, and it is happily not necessary for me to enter into any of the details relating to the chemical and scientific questions appertaining to the behavior of the salts of chromium in combination with organic substances.

The subject of my remarks this evening is essentially founded on the invaluable property which so much use is made of in all photo-mechanical processes, viz., the

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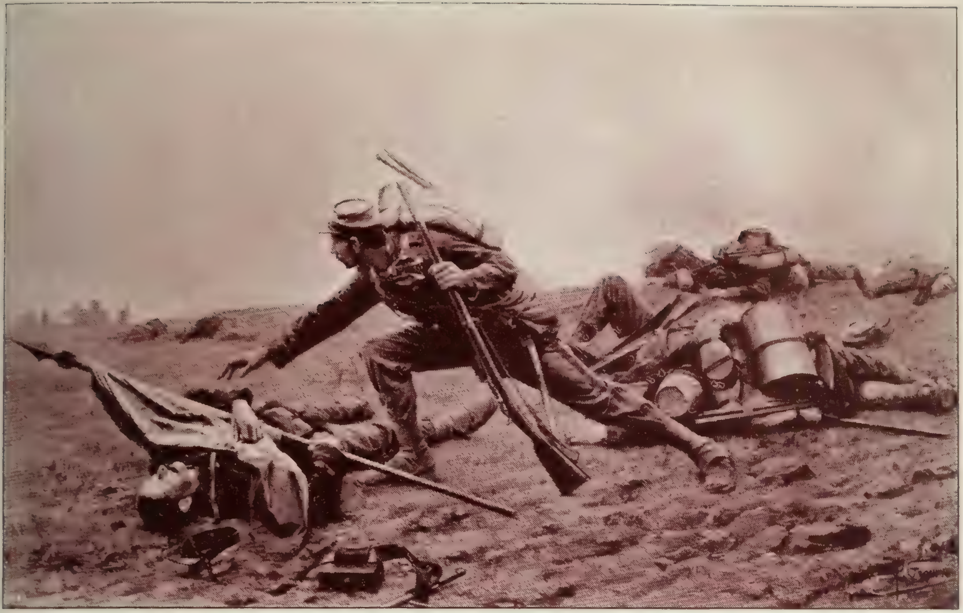
* From *The Photographic Journal*.

1



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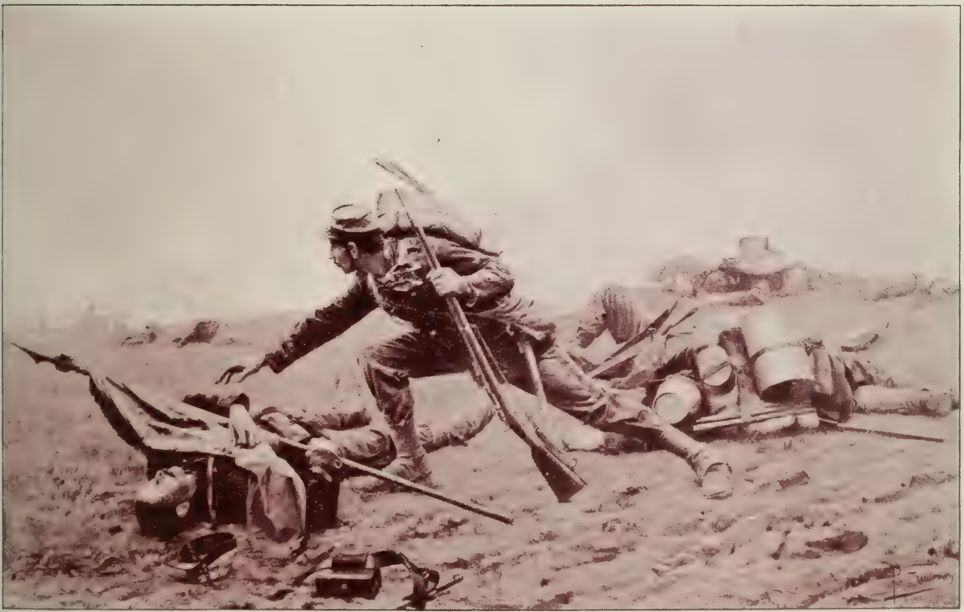

SPECIMEN FROM
ANDERSON'S MULTANGULAR GRATING.

INVENTED BY
MACFARLANE ANDERSON,
E. & H. T. ANTHONY, & CO., AGENTS.

HALF-TONE AND PRINTING
AT THE SCHOOL OF
PRACTICAL PROCESS ENGRAVING.

hardening action of light upon gelatinous substances sensitized with a bichromate salt, and the *modus operandi* of Woodbury printing may briefly described as follows:

1. The first process is the preparation of the sensitized tissue. A sheet of plate glass is cleaned and rubbed over with talc, collodionized and dried.

2. Gelatine, 2 parts; glycerine or sugar, ½ part; potassium bichromate, 2 parts; water, 15 parts, is made hot and poured over the collodionized plate and dried in an oven with calcium chloride.

3. The sensitized film is then stripped off its support and exposed under any ordinary good negative, the time being judged by an actinometer.

4. It is washed in hot water, and
5. Dried off in spirit.
6. It is then forced into a sheet of lead by hydraulic pressure.
7. The lead impression so obtained is fixed in the press and leveled.
8. The lead is covered with ink, a sheet of paper laid on and printed.
9. When the ink is set the print is removed, immersed in alum, dried, trimmed and mounted.

OPERATIONS.

A plate glass is carefully cleaned and rubbed over with wax or talc; the coating must be very thin; this prepared glass is then coated with a strong and tough collodion, and allowed to dry. The plate is then covered on the collodionized side with a thick, warm solution of gelatine containing about 15 per cent. of bichromate of potash with a little sugar, glycerine and coloring matter. The bichromate, of course, renders the coating sensitive to light, and the sugar and glycerine render it pliable and less brittle; the coloring enables the operator to better judge the quality of his picture. The plate thus coated is placed on a leveling stand to set, and when set is removed to a drying box containing dry chloride of calcium, which absorbs the water and soon desiccates the gelatine. The film of collodion and gelatine can now be stripped from the glass, and is ready for exposure under any good ordinary negative.

The second operation consists in exposing the film. The collodion side is placed in contact with the negative surface, and the exposure is made as nearly as possible with direct rays, either of sun or electric light; the film of insensitive collodion has an appreciable thickness, and unless direct perpendicular rays are employed for the printing, the image would suffer from want of sharpness. There is also another reason why straight rays are a necessity; the sensitive film, being semi-transparent, permits the light action to penetrate an appreciable distance into the substance of the film itself, and, as will shortly be apparent to you, if the light was diffused, would cause a blurring of the image; in fact, much the same effect as would occur were we to try to print from the glass side of a negative.

The third stage in the process is the washing out of the unacted-upon portions of the exposed film. To do this the collodion side of the tissue is laid down on a sheet of glass which has been freshly coated with a solution of india-rubber in benzol. The tissue securely fixed to this base is then plunged in warm water and gradually heated to nearly boiling point. The period of washing occupies some seven or eight hours, during which time the water is constantly changed. The effect of this washing is, as I have stated, to dissolve away all the gelatine not rendered insoluble by the penetration of light through the negative, and on the perfection of this operation depends the whole success of the working. Providing the exposure is correct, the whole of the gradations of tone in the negative will be rendered in the tissue by varying thicknesses of gelatine; the deepest shadows will be represented by the thickest portions, and all the intermediate tones being, so to speak, engraved out of the substance of the tissue, until the highest light (and consequently least acted-upon portion) is represented only by the collodion base upon which the relief is built. When the washing is deemed sufficient, and that is determined by there being no evidence of solubility in the relief, the tissue is dried by immersion in clean methylated spirit, and afterwards spontaneously. This completes the relief, and it is now ready for the fourth operation, *i. e.*,

Making the printing mould or die and it is here that the more surprising part of the process is evidenced. This apparently delicate and silk-like film has next to be bodily forced by enormous pressure between steel plates into a sheet of soft metal, which soft metal ultimately forms the printing surface from which the pictures are produced. A plate of hard steel, varying in thickness from 1½ to 2½ inches according to the size of picture, is obtained and rendered mathematically flat; to the four sides of this plate are bolted side plates projecting above the surface about $\frac{3}{16}$ of an inch, forming a kind of shallow steel box; the film is laid upon the steel surface, and over it is placed a sheet of hard rolled lead, ¼ inch thick; the whole is then placed on the planed iron ram of a specially constructed hydraulic press, and subjected to a pressure of from 2,000 to 5,000 pounds to the square inch according to the size of the picture. The result of the pressure is to impress in the metal in every smallest detail of light and shade represented in the relief, and forming an exact reverse of the "light mould" appearing in the gelatine. Thus the high lights represent elevations and the deep shadows depressions, in a bas-relief of the negative.

The metal plate is removed from the steel block by unscrewing the bolts on the sides, and the film stripped from its bed, the latter uninjured and ready for the production of any number of further printing moulds or dies.

The next operation is to trim the printing mould and fix it in the special press devised for the printing, which is effected by softening a lump of gutta-percha in warm water and placing sufficient on the bed of the press to cover it, and spreading it out evenly by means of the smooth glass-covered lid. On this bed of soft gutta-percha the mould is placed and allowed to remain until the bed is set, when it is ready for printing. The printing paper is composed of fine textured Rives paper, coated with a waterproofing solution of shellac in borax, and is subsequently highly rolled between polished steel plates. The ink used is also remarkable, and I can only liken it to a substance like calves' foot jelly; it is, in fact again gelatine, and is colored to represent a photographic silver print tone, platinum, Bartolozzi red, with suitable pigments. The ink, being composed of a gelatine base which sets if cold, is kept hot, and in this state is poured in a pool in the middle of the mould to be printed from, the mould being first oiled to prevent adherence, and a sheet of the waterproofed paper just mentioned is quickly placed on the top of the ink pool, and the heavy plate glass lined lid or top of the press is brought down with some pressure upon the whole, the result being that the gelatinous ink is spread and squeezed out over the whole surface of the intaglio mould, the hollows and depressions representing the shadows holding, so to speak, little ponds or pools of ink, and the elevations and high lights when the ink is pressed away being represented by whites or light tints. A few minutes in the press suffices to set the ink and attach it firmly to the paper, when it is peeled off, and the operation repeated for the next print. The print when examined wet from the mould is in high relief, and, indeed, is again a copy in colored ink on paper of the original relief which was pressed into the metal plate. This relief, however, soon dries down, and as soon as dry is fixed by soaking in a solution of alum in water and washed. The print, after drying, is then ready for trimming and mounting as an ordinary silver print.

Having given you a brief *résumé* of the process of Woodburytype, I will now ask you to go through it with me, step by step, and I will endeavor to show you exactly how the process is worked.

Mr. Geddes then demonstrated the several operations involved in Woodburytype printing. He said it was doubtful whether sufficient pressure could be applied to press the gelatine relief quite flat; attempts had been made to squeeze it into copper plates but greater power was required than he had at his disposal; the relief was not at all injured by the pressure to which it was subjected in endeavoring to get it into the copper. The printing paper was finally prepared for receiving the image by being rubbed over with an emulsion of shellac and gelatine, which gave it a sort of "tooth." The mould was lubricated with a mixture of olive oil and paraffin. He did not think the printing paper could be commercially obtained in London, but Messrs. Waterlow & Sons (Limited) would probably be willing to supply it; they made it themselves for their own work. The emulsion for preparing the printing paper might be made by mixing gelatine with ordinary shellac varnish and shaking until the mixture appeared like milk. Without an application of this kind the print was liable to split off the paper. Woodburytype appeared to be peculiarly adapted for the reproduction of portraits. It is a pity to say that there were drawbacks to such a beautiful process, but there were two rather serious disadvantages about it. In the first place, it had not yet been found possible to print with a clean margin, and, consequently, it was always necessary to trim and mount the prints; and, in the second place, it appeared to be impossible to apply a sufficiently even pressure to squeeze out the ink over a large white surface, such as the sky, and, therefore, any considerable expanse of white got rather smudgy. For portraiture, machinery, interiors, and for some classes of paintings, the variety of color which could be obtained and the permanency of the work rendered it a valuable and very beautiful process. With regard to Woodbury-gravure, a method had been invented by, he thought, Mr. Burrows, of the Woodburytype Company, which, to a certain extent, overcame the mounting difficulty, and a modification of which was occasionally worked by Messrs. Waterlow. The latter was founded on the old india-rubber carbon transfer process. The print was made on paper coated with india-rubber solution and transferred by pressure to plate paper, after which the india-rubber was dissolved by soaking in benzole and the original supporting paper removed, leaving the picture on the plate paper.

J. D. Geddes.

ANOTHER ROLL-HOLDER DECISION.

We understand that the application made by the Eastman Kodak Company for an injunction against the American Camera Company, on the ground that the Buckeye camera infringed one of their roll-holder patents, came up for argument on the 30th of June and that the motion was denied, the judge refusing to grant the injunction asked for.

COUNT VICTOR TURATI OF MILAN.

In 1894 Count Victor Turati of Milan exhibited some color prints which he said were made entirely by photography and printed in a single impression. He now announces that he will shortly publish his method of procedure. In the meantime it might be of interest to state that the Count has erected a photo chemical laboratory where he employs one hundred men in practically executing his experiments, so that he may look for some discoveries from his researches.

He has already devised, among his most recent inventions, a method of intensifying dry plate negatives by an electrotyping process, the intensifier being deposited in forty seconds.

He has succeeded also in making half-tone screens by electrotyping. The screen so made is a fine copper netting which, in use, is held between two sheets of thin plate glass.

The Count is also the originator of the idea of using a resin in the enamel solution for zinc.

The *Inland Printer* says of Anderson's book: "The field of photo-mechanical processes is covered, and the department of color work is given much space. The table of contents must prove attractive to the student."

In "Our Reviewer" column, we propose to criticise and comment on books, periodicals, samples of work, such as prints and booklets, apparatus, and, in fact, everything pertaining to the illustrative arts. It is our desire to encourage the sending in to us of such articles for review, and we will endeavor to conscientiously and fairly criticise them.

Half-tone engravers are devoting considerable attention to three-color work. We have to acknowledge the receipt of a pictorial booklet from Messrs. Kilburn & Cross, of Boston, on the front cover of which is quite an interesting bit of color.

The Blanchard & Watts Engraving Company, of the same city, sent us an exquisite reproduction entitled "Spring," and another three-color reproduction of an old building, both from wash drawings and both indicating that this firm are right up to date.

"**Photographic Amusements**," by Walter E. Woodbury. This is an extremely interesting and useful book, giving methods for obtaining many novel effects with the camera. All photographers have a desire to experiment, and this book will be a most useful guide to the production of results that may truly be considered startling. Many highly interesting illustrations lend point to the author's remarks. Price, $1.

In the way of hand cameras for tourists and general work, the Buck Eye Camera seems to combine every desirable feature. It can be reloaded in daylight and is very compact. The Special Buck-Eye can be used for either plates or films, and is a very efficient piece of apparatus.

The Climax Graduate has the advantage that while the division lines are accurately etched, the figures are in relief. This is of considerable advantage in the darkroom.

Some few copies of the "Process Year-Book" are still for sale. We wish that everyone could see a copy of this annual. It is a marvel.

X-ray enthusiasts should send for the four-page circular issued by our publishers.

Capt. Abney's book on "Instantaneous Photography" will be read with great interest at this time of the year when photographers are usually particularly busy with the shutter. Methods of measuring the speed of the shutter and comparing its efficiency, and, indeed, full details regarding the choice of shutters, etc., are given in this work; the price, 75 cents, brings it within the reach of everybody.

Of our illustrations the one that will attract the most attention from those engaged in the reproduction processes is that showing two of the effects obtainable with Anderson's Multangular Grating. A single line screen was fixed in the grating and gave the operators the means of producing several million different effects. Two of these are shown and are numbered 1 and 2. We hope, in succeeding issues, to further illustrate the possibilities of this piece of apparatus, which, it seems to us, gives the half tone worker a power that he has not hitherto possessed. We hope in our next issue to give further details regarding the grating, and those who desire to obtain advance information can get much that is desirable in the "International Annual" for 1896, and from "Anderson's Photo-Mechanical Processes."

Our frontispiece is made from a negative on the Carbutt Process Dry Plate, and demonstrates, we think, that dry plates have a future in photo-reproduction.

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"A MISTY MORN."

ANTHONY'S

Photographic Bulletin.

EDITORS:

PROF. CHARLES F. CHANDLER, PH.D., LL.D.
FREDERICK J. HARRISON.

VOL. XXVII. AUGUST, 1896. No. 8.

THE REPRODUCTION OF MOVING OBJECTS.

PHOTOGRAPHY has, during the past year, made many claims on the attention of the public. The truly wonderful results obtainable by Röntgen's method will continue to excite the interest and admiration of those interested in matters scientific, and will find extensive application in surgical circles. To the layman, however, perhaps one of the most marvelous outcomes of photographic research and inventive ability is the combination of instruments for reproducing, with practically absolute fidelity, moving objects, and exhibiting them in enlarged form upon a screen, with all distinctness, and with a truth that is amazing. What the phonograph does for the voice, the new apparatus does for objects in motion. With a perfect phonograph and a perfect apparatus such as we are about to describe, the words and actions of any speaker or number of persons may be recorded and exactly reproduced at any time. The full significance of this it is not easy to recognize to-day. But as the years roll by, the value of a combination of phonograph and vitascope will be appreciated. Events of to-day will be reproduced for posterity, and our children will marvel at our customs and scoff at our points of weakness. As a means of recording important events, the vitascope stands easily first.

We use the word vitascope without desiring in any way to give offense to the makers of other similar instruments, all of which are excellent in every way. The projecting apparatus is known under the names eidoloscope, vitascope, kineopticon, animatographe, and cinematographe, and in the results, as shown in the theatres and music halls, there is very little to choose between them.

The kinetoscope is doubtless familiar to all our readers, and the objections to it are obvious. The small size of the image, the obvious

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photographic effect, and the fact that only one person can, at a given time, view the traveling band of film, militate against its commercial success. Just as the sounding apparatus has, to a large extent, superseded the ear-pieces in the phonograph, so the projecting apparatus has relegated the kinetoscope to comparative obscurity. In the new apparatus the images on the traveling band of film are enlarged to life size and thrown upon a screen, thus affording an opportunity for the effect to be witnessed by a large audience.

The general principle of the method is as follows: A band of sensitive film, about one and three-quarter inches wide and some one hundred and fifty feet long, is, by means of suitable mechanism, exposed upon an object in such a manner that a series of successive exposures are made upon the band of film with a rapidity of from twenty-eight to fifty per second, each negative measuring about seven-eighths inch long and three-quarters of an inch wide. This band of film is then developed in large wooden tanks, fixed, washed, and dried, being afterwards run through a machine in contact with a second sensitive strip, upon which a series of positives are made by exposure to an electric light. This positive strip is developed and treated in the usual manner, the result being a succession of small lantern slides. This strip is punctured to fit the driving machinery, and is then run through the projecting apparatus at a very high speed, with the result that the object is reproduced upon the screen, showing the exact motion and expression existent at the time of exposure. The method, then, consists in making a succession of negatives in as short a time as possible, and exhibiting positives made from them in such a manner as to make one succeed the other as rapidly as possible, the impression to the eye being that of continuous motion.

The effects produced are simply wonderful. One very well conceived and remarkably successful record is that showing a suburbanite watering his garden by the aid of a hose pipe. His mischievous boy steps upon the pipe, thus cutting off the supply of water. The innocent amateur gardener, after puzzling over the cause of the trouble, proceeds to investigate, finally examining the nozzle. The youngster removes his foot, deluging his respected parent, who, after a lively chase around the garden, catches the urchin and administers chastisement. Shown on the screen, enlarged to life size, it is a truly remarkable series. Every expression of consternation, glee and disgust, and the various evolutions performed by each from start to finish, are faithfully reproduced, and the audience is aroused to a pitch of enthusiasm never excited at a lantern-slide exhibition, and seldom seen anywhere. Another record is a street scene, with two children dancing to the music from a hand organ. An actual street organ is played behind the curtain, and the whole effect is very real. In some instances the band of positive film is carefully colored, and here the effect is truly lifelike. When it is remembered that there may be five or six thousand positives to be tinted, it is seen that this coloring is no small undertaking. It is a peculiar fact that scenes from home life take better with the general public than more ambitious efforts. The record showing wash-day at home aroused much more enthusiasm than an acrobatic trio or a regiment of soldiers. The projection of these images is not absolutely perfect, but this is due to slight imperfections in apparatus and to other causes, which experience will enable the operators to overcome. The chief trouble seems to be due to a slight vibration, causing a certain amount of blurring. The source of this trouble may be in the taking camera or in the projecting apparatus, or in both. The sprocket wheel which engages the holes on each side of the band of film seems to us a source of trouble, for the holes in the film must become elongated, causing the film to slip a little. Again, if the feeding is at all irregular, trouble must ensue. These, however, are little difficulties that mechanical ingenuity will master.

During the past month some trouble has been experienced during the development of these long rolls of film from frilling and reticulation. This has been partly overcome by using cool solutions, but, until the film itself was cooled, some trouble was always experienced. The camera being principally of metal, and being exposed for some considerable time to the sun's heat, the film becomes quite warm, and the sudden immersion in ice-cold water is liable to prove disastrous. If the film is kept in a cool place for a few hours, developed and fixed in cold solutions, and washed with water that has passed through an ice tub, no trouble will be experienced. The expense attached to the making of a record is not inconsiderable, and in many cases duplication is not possible ; every precaution is therefore necessary.

HINTS ON TONING.

AT the School of Photography held during the Convention of the Photographers' Association of America, one of the most interesting classes was a demonstration of the toning of Aristo-Platino paper by Mr. John F. Decker. The demonstrator was fairly overwhelmed with questions, and from his answers thereto the following hints have been extracted :

The paper should be printed until the high lights begin to tint.

The negative that will give the best print on albumen paper will give the best print on Aristo-Platino. Thin negatives give better results with red tones.

Red and rusty spots are due to finger marks on the face of the paper, being principally caused by perspiration from the hands. Brilliant red spots are usually caused by insufficient preliminary washing. At least four changes of water should be used, and, if the water is very soft, more alkali in the toning bath is needed.

Only red litmus paper is necessary, and the gold toning bath should be made decidedly alkaline with borax, and should tone in about six minutes.

The print should be toned in the gold bath until there is still some warmth in the shadows ; the more red there is left in the print in the gold bath, the more olive will the print become in the platinum bath.

If the print is toned too quickly, uneven toning will be the result ; if too slowly, muddy prints will be produced.

While it is sometimes advised to use half old and half new baths, this is not to be recommended when the best prints are desired, for the presence of the old bath will often cause muddiness in the high lights.

After toning in the gold bath the prints should be washed in two changes of water and placed in the platinum bath, which should tone the print in about six minutes.

If toned too slowly, yellow prints will result ; if too quickly, the prints will probably bleach.

When the prints are removed from the platinum bath they should be well washed in water, and should be kept in motion during this washing. After washing in two changes of water the prints should be fixed in a hypo bath testing 18 by the hydrometer, and ten minutes in this bath will be found sufficient.

After fixing, a wash of ten changes, with the water allowed to remain in each tray for five minutes, or two hours in running water will suffice.

The prints should be dried on a rack having slides far enough apart to permit of the free circulation of air, and rolled dry with a cold burnisher.

If the prints are too damp when burnishing, the grain of the paper will be destroyed.

THE CAMERA CLUB.

TWO well-known American photographic societies were the Society of Amateur Photographers of New York and the New York Camera Club. One dated back twelve years to the days when dry-plate photography first began to attract public attention ; the other was well known in the photographic world. Both are now merged into one organization under the name of The Camera Club. The necessary legal formalities have been observed, and the old clubs with the new name have apparently a rosy future. The journal issued by the club states : " A programme of earnest work has been mapped out by the Committee on Meetings, and, backed by the zealous co-operation of the individual members, there is no doubt that The Camera Club will not be behind its predecessors in making history." We are glad to see that The Camera Club is free from debt, and that its rooms at 113 West 38th street are equipped with as fine an outfit as could be desired. We wish the organization every possible success. The proceedings of the club are published at regular intervals, and there is every prospect that it will do much to advance the science and art of photography.

The new officers are : President, Dexter H. Walker ; Vice-President, William D. Murphy ; Secretary, Charles W. Canfield ; Treasurer, Camille C. Roumage ; Trustees, William J. Cassard, Allen E. Churchill, William Bunker, Louis B. Schram, William B. Post.

Items of Interest

WORK has commenced on the ninth volume of "The International Annual," and such of our readers as have real information to convey are invited to contribute to it. The object of the book is to present to workers in photography and photo-reproduction a *résumé* of the progress made during the past year, and to impart information on the many branches of our art-science. It is, in fact, an arena for discussion and a place for essays. We should also be glad to receive for reproduction sketches or photographs having some definite object and teaching a definite lesson. A brilliant list of contributors has already been obtained, and there is every prospect that the 1897 "Annual" will occupy a high place in photographic literature.

The yellow screen for orthochromatic photography is, says Prof. W. K. Burton, a screen of glass or some other transparent medium, which should be of a faint yellow tint. Tested by the spectroscope it should be found that it greatly reduces the violet and the blue color, but slightly affects the blue-green, and does not affect the yellow-green or any of the lower spectrum at all. This screen is commonly used in front of the lens, behind it, or in the diaphragm slit, and, if used in any of these positions, must be glass "optically ground," otherwise the image formed by the lens will be spoiled. The color that has proved far the best of many that I have tried is that of either picric acid or picrate of ammonia. This I mix with gelatine and water, and pour on plates of glass the exact size of the dry plates to be used. The gelatine presently sets, and after a time dries. These plates are used film to film with the dry plates, and, although it is thus possible to get only one dry plate in each double dark slide, the method works far better in my hands than that of having a screen at or near the lens. For one thing, any kind of fairly flat glass will do. Patent plate is even unnecessarily good, and then there is no trouble in fitting the screen to a particular lens, but any lens may be used.

Concerning orthochromatic plates, the same writer says that a thing seldom taken into account is the fact that all orthochromatic plates are far from being sensitive to the same parts of the spectrum. One hears it commonly said that different kinds of subjects need plates sensitive to different parts of the spectrum, and that different depths of yellow screen should be used for different subjects. These statements are not strictly correct. If the light remains of the same color there is only one kind of plate that is hypothetically correct, and that is a plate sensitized to all colors. Moreover, there is for this plate only one hypothetically correct color screen, the subject constituting in truth no factor in the business. There is a certain degree of truth in the statement however. What is really meant is that there are many subjects with which practically as good results are got with partially orthochromatized plates as with those plates that are fully orthochromatized, and it is much easier to work partially orthochromatized plates than with those orthochromatized to all visible light. For example, for ordinary landscape work, including foliage, clouds, and perhaps snow-capped mountains, there is no practical advantage in orthochromatizing farther down the spectrum than well into the yellow. The plate should be as thoroughly as possible orthochromatized for the yellow-green, but no appreciable advantage will be found to arise from orthochromatizing to the orange and red, while the plate will be ten times more difficult to work, as it must be handled in what is very nearly total darkness if sensitized for red and orange as well as green and yellow.

* * *

We heartily agree with Mr. Burton's suggestion that plate manufacturers inform purchasers for what part of the spectrum their plates are orthochromatized, and what color of light should be used in manipulating them.

* * *

Orthochromatic plates should receive far more attention from photographers. A comparative test with ordinary and orthochromatized plates would be a revelation to some. Of course, the necessity for using a color screen means increasing the time of exposure; but with a backed orthochromatic plate and a color screen there is a difference in the resulting negative that justifies the expenditure of time and labor.

* * *

Much has been made of the necessity for care in the development of orthochromatic plates and the difficulties arising from the necessity of using a very subdued light. While it is, of course, true that less light is used, and perhaps more care necessary, it is also true that the worker soon becomes accustomed to working under these conditions. The extra precautions do not by any means present as great difficulties as the first lesson in the darkroom. There is no good argument against the use of backed orthochromatic plates.

* * *

In our July issue, through an error in proof-reading, the number of breaks in the current used in making the X-ray picture that formed the frontispiece was placed at two hundred per minute, instead of two hundred per second.

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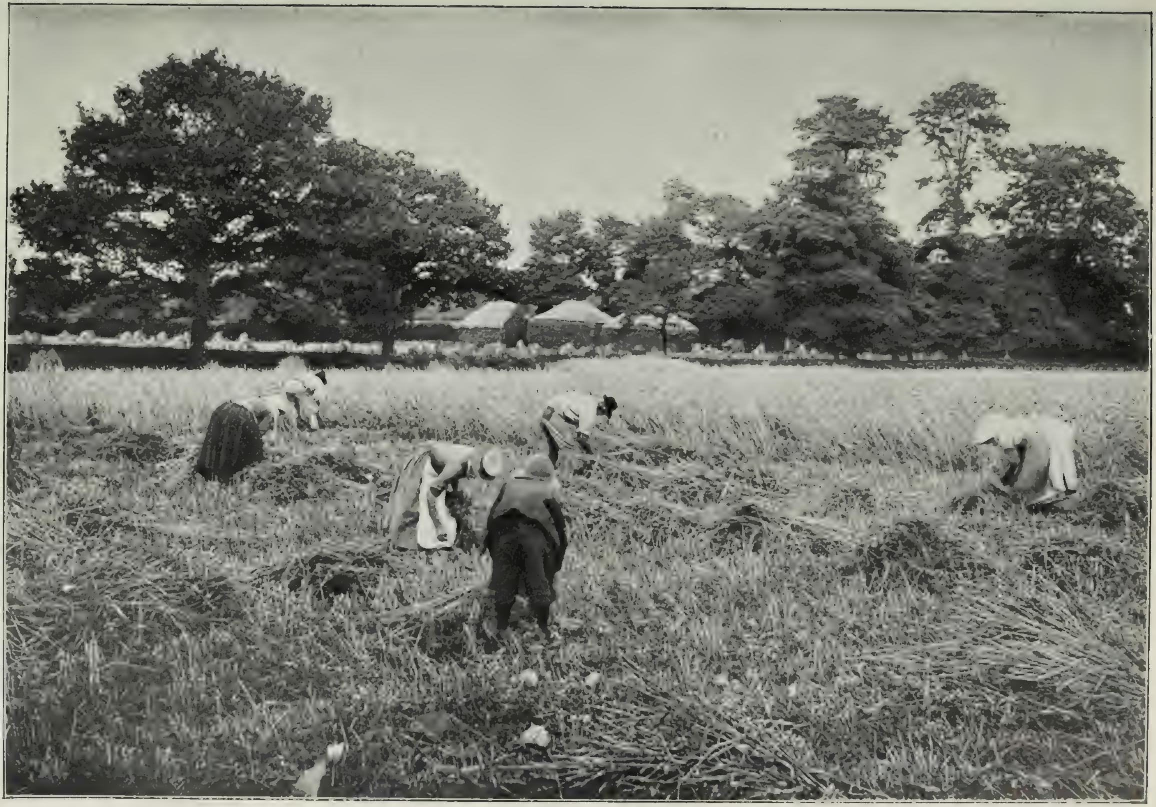
Of the many new books on photography that have been published this year, perhaps the most important is "The Elements of a Pictorial



"REAPERS," BY W. COOPER ENG.

Photograph," by H. P. Robinson. In the preface the object of the book is well stated, and that object is helping the amateur to recognize that there is more in photography than the taking of a simple photograph; that its materials are only second in plasticity to those of the painter and draughtsman, and that, if they are more difficult to manage, there are effects to which they are even more adapted than any other means of art. A book such as this should be read and re-read by all connected with photography. The author has done much by his photographic work to raise photography to its true position, and the words of wisdom embodying the results of his mental study and practical experience are of untold value.

* * *

"In the arrangement of flowers for photographing, the following points should be borne in mind. Although their disposition should not be obviously forced where a number of blossoms are in question, it is well to group them in well-considered planes, so that while the front rank of blooms, leaves, stalks, etc., are capable of sharp definition, a secondary plane is in subdued distinctness, while a third plane—the true background--should be still more indefinite. Much care must be taken that no portion projects from the principal plane towards the lens, as otherwise, unless an unusually long focus lens is used, one obtains a malignant distortion."—Maclean.

* * *

In the appendix to Eder's *Jahrbuch*, Count Turati gives a specimen of color-printing, in which all the colors are said to have been produced at one printing. The process is called synchromie.

* * *

When copying from old albumen prints, trouble is sometimes caused by the fine cracks on the surface of the print. This difficulty may be overcome by removing the print from the mount and squeegeeing it to a piece of flaw-clear glass, the copying being then done through the glass.

* * *

"The only outlines in Nature are where one thing ends and another begins. The further we are away, the less we see this beginning and ending. Sharpness of outline or contour is antagonistic to the expression of distance and of aerial perspective, *i. e.*, distance values."

* * *

Ducos du Hauron, the veteran worker in color photography, writes in *Photo Archiv*, as follows:

"My photographic color system consists, as is known, of three monochromatic positive images superimposed. The first of these images is obtained by blue-violet light, and printed in yellow. The second is obtained by green light, and printed in red. The third is obtained by orange-red light, and printed in blue. The impression is, in this case, made upon a white surface. Recently I have discovered a surprising fact, that an image compounded of only two of the monochromes can give to the eye as complete a play of colors as that compounded of all three. The novelty consists in leaving out the yellow image and superimposing the red and blue; but hitherto this has only been successful when madder lake and prussian blue are used. The image thus obtained must not be viewed by bright white light, but shows well with a feeble white light, or better with the feeble yellowish light of a candle or lamp; but the perception of the colors does not depend upon this use of yellow light. The third color appears to be seen, although one is certain that it is not present."

* * *

Speaking before the Royal Photographic Society on color screens for orthochromatic photography or specially selective color work, Mr. Ives said that the best method of preparing a color screen is to coat a flat glass plate with a film of gelatine, to stain this film with a suitable coloring matter, and then, by means of Canada balsam, to cement on a cover glass. The colored film is thus protected by being enclosed between two glass plates; collodion, however, answers well as a vehicle for the coloring matter, although somewhat liable to blister.

By looking over a large stock of the so-called patent plate glass, or of the thinner kind of cast plate glass, there is seldom any difficulty in selecting samples sufficiently flat and sufficiently parallel for use as a basis for the screen. When the reflection of a distant gas flame is viewed, the two reflections are scarcely distinguishable if the surfaces are parallel, but are more separated if the surfaces are unparallel. If both surfaces are flat but unparallel, the separation will be constant, although the glass may be shifted; but if even one surface is not flat, the separation will vary according to the part from which the reflection is taken.

For preliminary experiments upon dye-stuffs it is often convenient to coat glass with plain collodion, and then to stain the film with an alcoholic solution of the dye; but when a coloring matter is determined upon, and several screens are to be made, it is best to make up a colored collodion. When using the so-called "brilliant yellow," the following proportions are suitable:

Saturated alcoholic solution of brilliant yellow	4 ounces.
Pyroxyline	40 grains.
Ether	4 ounces.

In coating a plate with collodion, a certain thickening of the film towards the corner at which the fluid is poured off is unavoidable, but by mounting two plates, face to face, with the thick corner of one against the thin corner of the other, a virtually equal screen is obtained. Such a double screen is dense enough to make a yellow object come out lighter than a blue object, if an ordinary plate is used, but it is somewhat too deep in tint for use with an orthochromatic plate. The "brilliant yellow" is specially useful as a dye for the screen, as it cuts off the ultra and deep violet, also successively obscures the rays of lower refrangibility, while naphthol yellow (Martius's yellow) appears

"ELECTION RETURNS," BY J. M. BROOKS.

"AUGUST."

Made with the Quad Camera.

rather to cut the spectrum sharply in two. The collodion film must be dried in a warmish place, as, if it chills, and minute drops of moisture gather on the collodion surface, the screen is made spotty and is spoiled. A thick solution of mastic in benzole is a good varnish for the screen, and Canada balsam is used between the two plates which are cemented together; spring clips and afterwards an edging of gummed paper are used in retaining the cemented plates in position.

THE latest studio accessory seems to be the bicycle. A London firm advertises as follows: "To lady bicyclists. Ladies photographed on bicycles. Machines kept in the studio."

"CAMP ARISTO" AT THE CHAUTAUQUA CONVENTION.

THE qualities to be looked for in a lantern slide are fineness of deposit, freedom from granularity, absence of fog, transparency and good color.

The Photographic Dealer is the name of a new English journal. Its avowed object is "to produce a periodical which shall not only keep the dealer fully posted up in the latest items of news connected with his trade, but which shall supply practical and helpful information calculated to enable him to improve his position on the ladder of success." The first issue is a good one and will be found very useful by those engaged in the selling and manufacturing of photographic supplies.

All copy for the September issue must reach us on or before August 20th.

INTENSIFICATION AND REDUCTION.

THE production of a perfect negative is not always a certain thing. The improved forms of exposure meters have greatly reduced the number of failures in negative making, but it does not always happen that we are in position to consult such instruments at the time of making an exposure, in which case we must depend to a certain extent on chance. Then, in developing, we are again liable to errors in judging of the extent to which the operation should be carried, and the modifications that should be made in the developer. Finally, after every care has been taken during the whole operation, it does not always happen that the negative turns out to be of perfect printing quality. The only remedy, then, is either intensification or reduction according to what the case may require.

The intensification of gelatine negatives is an operation described by the text-books in such a disparaging way that very few photographers have ever attempted to avail themselves of its advantages. The direction sheets sent out with dry plates generally give formulas for intensification, but they say at the same time that it is better to throw the negative away than to intensify it. This notion regarding intensification has prevented its general use, and the result is that the details of the operation are never learned sufficiently to properly apply it. A little more knowledge in this department would enable the photographer to save a great many plates which he would otherwise consider absolute failures. While it is certainly better to avoid any after-treatment of the negative, and to depend on development alone, it is not always possible to do so, and when intensification must be resorted to, it becomes an important matter to know what formula to use, and the best manner of applying it. When the proper methods are employed, and every detail of the operation properly attended to, there is no reason why an intensified negative should not be as perfect in every respect as one which has been formed by development alone.

When a negative turns out to be weak and fails to give satisfactory prints, the first thing to be considered is whether it should be intensified or reduced; in some cases both operations will be required. Negatives that give weak prints on account of over-exposure are always slightly fogged in the shadows, and if submitted to intensification in this state will invariably result in failure. Nevertheless negatives of this kind are often intensified without any preliminary treatment, and the effect is simply to clog the shadows and make the case worse instead of improving it. A reducer should first be applied until the shadows have become quite cleared off; this operation may prove to be all that is required, but if the negative is still too weak to give satisfactory prints, the intensifier may then be used to advantage. Properly exposed negatives that have been fogged from exposure to an improper quality of light in the darkroom may generally be restored by reduction followed by intensification. Under-exposed plates generally become fogged from prolonged and forced development, and become over-dense in the high lights. Negatives of this class may be corrected by reduction alone.

For all ordinary work the uranium intensifier will be found to give the most satisfaction. The mercurial methods have certain advantages where great density is desired, but their application is difficult, owing to their liability to uneven action. The uranium intensifier acts with perfect uniformity and gives permanent images—an advantage which is not possessed by the mercurial method.

For intensification with uranium prepare a solution as follows:

Uranium nitrate	5 grains.
Water	1 ounce.

Also prepare the ferricyanide solution:

Ferricyanide of potassium (red prus.)	5 grains.
Water	1 ounce.

The bottles containing these solutions should be kept wrapped in black paper to exclude the light. The negative to be operated on must first be carefully examined, and if there is any deposit in the deep shadows, this must be removed by reducing. For this purpose make a solution of hypo of about the strength used in fixing, and to each ounce add 5 or 6 drops of the ferricyanide solution given above. Flow this mixture over the plate, and keep it in motion until the shadows begin to clear off. Then hold the plate against a black background and examine it by reflected light; in this position the image will appear as a positive. If the action of the reducer has gone far enough, the deep shadows will be perfectly black, while the detail in the half-tones will be plainly visible, otherwise the reduction must be continued further. The extent to which this process must be carried will depend largely upon the subject itself; too much reducing will destroy the detail in the shadows, though this may be unavoidable in some cases in order that certain other points may be brought into prominence. Very close attention must be given in this part of the operation, otherwise the reduction may be overdone. When the right stage is reached, the solution must be thoroughly washed from the plate. The negative will then have the appearance of one taken on a wet plate. Such an extreme degree of clearness is not essential to good printing, but unless the negative possesses this quality, it is not in condition to receive intensification.

We may now apply the intensifier, which is prepared as follows:

Ferricyanide solution	1 dram.
Uranium solution	1 "
Water	4 ounces.

The negative is placed in the tray and the solution flowed over it and kept in motion. The image assumes a fine brown color, and the details become more distinct as the action proceeds. When the density is judged to be sufficient—taking in the non-actinic color of the deposit—the negative is washed in four or five changes of water and set to dry.

This method of intensification preserves all the fine gradations in the negative without introducing any hard contrasts. The image formed is permanent, and of a much finer color than that formed in mercurial intensification. Negatives that give fair prints may often be greatly improved by being put through this process.

Corwin Gitchell.

THE PREPARATION OF TEXTILE FABRICS FOR PHOTOGRAPHIC PRINTING.

PHOTOGRAPHIC vignettes upon bands of silken ribbon make handy bookmarkers which cause pleasant reminiscences of one's holiday. Souvenirs of this class are very inexpensive, yet they often form more acceptable presents than paper prints.

The best ribbon for the purpose is a pure China silk (without rib markings) or a really good satin; the color is, of course, a matter of individual taste, but personally I prefer a pure white or pale cream.

To prepare the silk for printing, it must be first immersed in a salting composition, and then, after drying, in a solution of silver nitrate to render it sensitive to light.

A salting solution that appears to be a favorite is made as follows:

Alcohol	1,000 parts.
Benzoin	8 "
Mastic	5 "
Cadmium chloride	30 "

The silk must be immersed in this solution for about twenty or thirty seconds, and then placed for a moment between sheets of clean white blotting paper to remove the surplus solution; it may then be placed to dry in a current of air. A stock of material can be thus salted, as it will not deteriorate by keeping, and is ready for sensitizing at a moment's notice. When quite dry it should, of course, be packed away in a place free from dust.

The sensitizing bath is as follows:

Silver nitrate	12 parts.
Water	100 "

or, roughly speaking, 60 grains of silver nitrate to 1 ounce of water.

The salted fabric should be immersed in the silver solution for about one minute, blotted between clean white paper, and then put away to dry in a dark place. Drying may be accelerated by heat. For instance, the ribbon may be placed between several folds of blotting paper and a hot iron passed over it. This will not only dry the material, but will also render it perfectly flat. In any case (whether dried spontaneously or not) it should be ironed before printing, as this treatment, by flattening the fabric, prevents failure that might otherwise occur, owing to uneven contact between material and negative.

Printing should be carried considerably deeper than usual with emulsion papers, and care must be observed when examining the impression, otherwise blurred lines may occur. A good plan for obviating this trouble is to attach the silk to a slip of thin card by gumming the ends to its back. The thin card thus affords a foundation that will prove a decided help while printing. Of course the gum will dissolve in the washing waters, and the silk will be none the worse.

When the prints are sufficiently deep they must be thoroughly washed in five or six changes of water (about five minutes in each), and then toned in any good toning bath suitable for Aristo, the only precaution necessary being to dilute it with an equal bulk of water if it tones too rapidly. The following bath is a good one for the purpose :

Soda bicarbonate	10 grains.
Water	10 ounces.

When dissolved, add—

Gold chloride	1 grain.

The prints must be kept moving all the time they remain in the toning bath, and when sufficiently toned they must be rinsed in clean water and then fixed in—

Hypo	1 part.
Water	10 parts.

for about ten or fifteen minutes.

After fixation, a good washing for a couple of hours in several changes of water will complete the prints, which may then be hung up in the open air until almost dry ; a final ironing between pads of clean blotting paper will give them a nice finish.

These prints may be finished in monochrome or water-colors with good effect. The colors used should be diluted with alum water, about a 10 per cent. solution being suitable.

No matter how much care one takes during printing, light will sometimes get in around the margins and cause an impression beyond the actual confines of the vignette ; sometimes the vignette itself is not altogether satisfactory. It is as well to know that the marks can be entirely removed by treatment with solutions of potassium cyanide and iodine, but we must also bear in mind that the solutions are most active poisons, and should be kept closely locked up.

Two separate solutions should be made :

(*A*) A saturated solution of potassium cyanide in water, and

(*B*) A saturated solution of iodine in alcohol,

a " saturated solution " being as strong a solution as can be made (by shaking) at the ordinary temperature.

For use we must mix four drops of *A* with two drops of *B*, and apply to the silver stain with a tuft of cotton wool. In their concentrated condition the solutions work with extreme rapidity, so they may be diluted for use as required ; the addition of water simply slows the action and brings it under control.

Another favorite method of sensitizing fabrics is to first immerse them in a salting bath made by pouring 20 ounces of boiling water on 100 grains of ammonium chloride and 60 grains of Iceland moss, which can be bought of chemists at a shilling a pound. Stir the mixture until nearly cold, and then filter and immerse the fabric for fifteen minutes. After drying the material, it may be sensitized by a few minutes' immersion in a 30 or 40 grain bath of silver nitrate (*i. e.*, 30 or 40 grains to each ounce of water), and then dried and ironed flat before exposure.

In addition to making useful bookmarkers, these vignettes on silk or satin form very neat covers for scent satchets, pincushions, etc. But at this stage I had better leave the matter, simply expressing a hope that some of the lady readers of this page will give the process a practical trial. They will, I know, be able to turn it to account in far more ways than I dare mention, perhaps even going so far as to use vignetted views as part of their personal adornment.

W. ETHELBERT HENRY, in *The Amateur Photographer*, Eng.

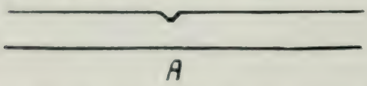
* * *

GLASS STIRRING-RODS—TO MAKE.

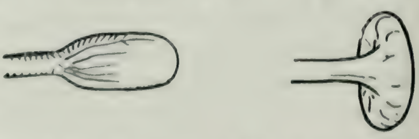
A FEW glass rods of various lengths and thicknesses are very useful in the dark-room—to assist solution, etc. Ned. Cuttle tells how to make them in the *Amateur Photographer*.

Glass rod looking like white pot, and known as milk-white rod, or opal rod, is often sold for this purpose, and is more easily seen in the darkroom. Having cut the rod the required size, the ends are softened by heat, when they gradually become fairly round at the ends. (N. B. – In all glass-working operations the glass must be slowly heated and slowly cooled, or it will most probably crack.) A good-sized spirit lamp, or still much better is an ordinary bat's-wing or fish-tail gas burner. Gradually bring the end of the rod down towards and then into the yellow part of the flame until it glows red, softens, and all roughness disappears, then slowly remove it and lay aside so that the hot end does not touch any cold substance.

Glass rod or tube is usually sold in various lengths (of about 3 ft.) and of various sizes, usually from about the thickness of a stout straw to that of one's finger. In making stirring rods or connecting tubes for various experimental purpose, various lengths have to be cut off. This is usually done by making a fine nick by drawing a sharp three-cornered file sharply across the length of the rod or tube. The sketch shows the nick greatly exaggerated for diagrammatic clearness. The rod or tube is now held by the two hands—somewhat in the same way as one holds an oar—the thumbs are placed together at *A*, *i. e.*, just opposite the file cut, and with a slight bending motion, also a slight pull as though to separate the two hands, the piece comes apart at the crack.



A useful form of glass rod is shown in the accompanying sketch. One end of the glass rod is softened in the gas flame, and at the same time some smooth, flat piece of metal is made fairly hot. The glass rod is gently pushed against the warm flat metal, forming a round but flattened end, as shown in the figure. This is very useful for crushing small crystals, and so hastening their solution.



The other end is made quite soft, and is easily nipped with the ends of a pair of flat-nosed pliers. This forms an end something like a drain-cutter's clay spade, and is very useful in dislodging the contents of a bottle that have dried into a solid mass.

THE JEX BARDWELL HOME.

THIS project has now reached a more business-like shape, with more hope that the work will be carried on to success by the earnest committee appointed at the Celoron Convention. Jex Bardwell, with his usual generosity, delivered the first practical address to the working members. It was full of useful hints on stereoscopic photography and other matters.

Mr. Bardwell was immediately followed by Mr. Edward L. Wilson, who made an address advocating the purchase of a home for Mr. Bardwell. Among other things, Mr. Wilson said :

" The object of my being here just at this present moment is to say a word in behalf of procuring a home for Jex Bardwell. This project has been mentioned frequently in other conventions, but somehow we do not get hold of the matter aright. An old story tells of an Irishman who tried to commit suicide by hanging himself. A friend of his went into the barn and saw him suspended with a rope around his waist sprawling out all fours in every direction. The friend, looking up, said: 'Pat, what the devil are you doing ?' 'I'm hanging mesilf.' 'Well, why in thunder don't you tie the rope around your neck ?' 'Oi did,' answered Pat, 'but Oi could not git my brith.' Here is the point. We have had the rope around the waist for a long time, and our object continues to fail. Let us get the rope in the right place and pull hard together ; the Bardwell home will rise up before us. Mr. Bardwell, as you know, was the principal witness in a celebrated patent cause, wherein all photographers were interested. It was for the prevention of the reissue of Cutting's patent for the use of bromides in photography. Had this patent been renewed, millions of dollars would be required from photographers. Mr. Bardwell is now an old man. Fifty years ago, week before last, I think it was, he was married. His bride is still living, and they have no home. Let us get the rope about the neck and all help pull. I think one reason that it has not been accomplished is because of ignorance as to what has been done for us. We ought not to be

JEX BARDWELL, JR., AND SISTER.

ashamed to confess our ignorance, and correct things. Dr. Samuel Johnson once made a mistake—we all do that sometimes—and a lady expressed astonishment that he should do so. When she accused him of it, and asked him why it was, he growled out in his usual way, 'Ignorance, madam, pure ignorance.' So it is ignorance of facts that is keeping us back. Let us do something. Let us have the sanction of the Association in behalf of Mr. Bardwell, and let us go to work and make the old protector happy all the rest of his life."

The time for adjournment having arrived, this matter was laid over until the Wednesday morning session, when President Bellsmith said:

"Yesterday, Mr. Wilson, in speaking of our friend, Mr. Bardwell, suggested that a committee be appointed to consider the raising of a fund for a home for Mr. Bardwell. No action was taken, and I think this an opportune time for some action to be taken. What is your will?"

Moved by A. L. Bowersox that a committee of five be appointed to attend to this matter. Seconded.

By the President: "It has been moved and seconded that a committee of five be appointed to consider the matter of raising a fund to procure a home for Jex Bardwell. Any remarks? Wouldn't it be a good plan to have that committee report to-morrow?"

By Mr. Wilson: "I hope I may be excused for saying so much on this subject, but this object has been very dear to my heart for a good many years, and I would like to see progress made. I do not propose that any great effort should be made right here and now, but I do want the sanction of the Convention. I feel that I have the good-will and friendship of my fellow-workers. Let us in some way requite this old man who is with us. He has really done much for us. Even though all do not feel it and understand it, yet all get the benefits of his effort. He did a great work for us. He is old. We don't want to shut him up in a 'home,' with his wife and little grandson, who is going to make a great photographer some day. We want to give him a home in Detroit. Now, $2,500 will do it. I ask you to appoint a committee who would be glad to receive funds, if not now, some other time, from those who appreciate what he has done for us. I may state that yesterday an old friend met me, and said 'Put me down for $100.' That is the kind of thing we want, but we also want the 5 cents. Give as your hearts prompt you. I am willing to do much of the personal work, but I want to feel that you are friendly to the project. It will help win others. Give us your hand." (Applause.)

By the President: "You have heard the motion that this committee of five be appointed for the purpose of procuring a fund for Jex Bardwell. All those in favor say aye; contrary, no. Carried."

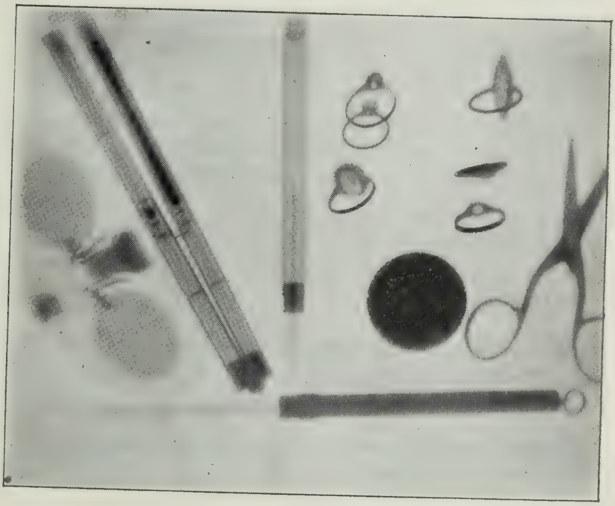
The President appointed as the committee G. Cramer, Orville C. Allen, George Steckel, J. Edward Rösch, and Edward L. Wilson.

Any of these gentlemen will be glad to receive subscriptions for the Bardwell home until they organize, and they will make earnest effort to accomplish the end in view.

SOCIETIES

ALBANY CAMERA CLUB.—A highly successful exhibition of X-ray photography was given in the Normal College at Albany, N. Y., on the 13th of June, under the auspices of the Albany Camera Club, for which the General Electric Company, through the kindness of Mr. H. C. Wirt, furnished the use of a newly constructed apparatus for the generation of the electrical current.

The hall was filled with some seven hundred prominent citizens, all anxious to view the wonders of the new element in photography and physics. At a few minutes after eight o'clock, and after a few brief introductory remarks by Prof. E. W. Wetmore, of Normal College, the current was turned on, and the wonderful little spark of light which does so much and of which we know so little soon appeared in the pear-shaped vacuum tube.



A black box 8 x 10 inches and about 1 inch high contained a Cramer C plate, wrapped in a piece of black paper. On the top of this was a cardboard, upon which were placed several articles of jewelry, a pair of eyeglasses, a silver dollar, a pair of scissors, and numerous other articles. The whole, covered tightly, was placed directly under the bulb and left for a matter of ten minutes, after which it was removed for development.

During the interim Prof. Wetmore addressed a few remarks to the audience, and through the courtesy of Prof. Stevens, of the Polytechnic Institute of Troy, was enabled to illustrate these remarks with a large number of lantern slides made by means of the X rays.

The gentlemen who had charge of the developing of the negative, exposed as above stated, were quite successful with this operation, and by means of the use of formaldehyde were able to dry it immediately, and from it to make a lantern slide, which in turn was also dried, and in less than half an hour the image was projected upon the screen, and met with a round of hearty applause from those present.

The attempt to make a picture before an audience and present it upon the screen has seldom, if ever, been done under like circumstances; but the Albany Camera Club, always progressive, not only did this, but did it well, with an exposure upon a plate which had been wrapped in black paper at the bottom of a black box.

As this exposure in itself is instructive, it was deemed advisable to make a half-tone plate for the BULLETIN, and call attention to the jewelry which there appears. Side by side will be found the genuine diamond ring and the paste diamond. In the first instance nothing appears but the setting, the genuine diamond being absolutely transparent. The paste jewel, however, is quite visible, appearing as a dark spot in between the setting, showing the same opacity to the X ray as does also the lens of the eye-glass which is shown through the case. Just above the genuine diamond and the paste diamond rings is shown an opal ring which is somewhat transparent, although not so much so as the diamond. The marquis ring was also genuine diamonds, which appear in the picture as holes. Above the marquis ring is a paste jewel, and above that again a genuine. The difference is very apparent. This in itself will prove the usefulness of the X ray for the determination of the genuine article, and our amateur friends will without doubt soon be testing their jewelry by this method. It would be well, however, to caution them to do this in private first, for if they should have been the victim of some wily jeweler they can keep the knowledge to themselves. The projecting pencil shown on the plate was a rubber and wood one; the difference is quite marked. The rule was bone; the scissors and the silver dollar are perfectly opaque, as is shown.

After the exhibition a limited number of the audience remained to look through the fluoroscope.

OF INTEREST TO ALL.

The Photographers' Association of Michigan offer the following prizes, which will interest artists outside of Michigan:

The most artistic novelty in photography, one gold medal.

To photographers outside of Michigan exhibiting one photograph 16 inches or over: First, one gold medal; second, one silver medal.

For the most artistic design for a diploma, $25 in cash.

The Photographers' Association of Michigan holds its second annual meeting in February, 1897, and we hope to make it the banner State convention.

J. E. WATSON, *Secretary*,
148 Woodward Ave., Detroit.

WOMEN AS PROFESSIONAL PHOTOGRAPHERS.

AT the editor's request I jot down a few remarks on the subject of "Women as Professional Photographers." The beautiful art of photography, at once so attractive and so useful, can it not be adopted as a profession by women? was the question that arose in my mind when I was eighteen years of age. Undoubtedly others of my sex wishing to engage in this fascinating occupation are now asking themselves the same question. With a determination to become a successful photographer I have for the past five years availed myself of every possible means of advancement, putting into practice what I learned from experimenting, aided by careful observation and study of the rules given in books and periodicals. The study of art is the work of a lifetime, and true success follows a feeling of love for it rather than a technical knowledge. So little of art can really be taught, but it can be educed, developed and cultivated by some minds. Where education would be impossible, except in the smallest degree, I can only say from experience that all possible knowledge must be acquired, the same applied, and then in patience the result of art culture must be awaited. In these days of dry plates the chemical part of photography has been greatly simplified, and woman, with her natural good taste and intuition, can successfully embrace professional photography as a profession, if equipped with a determination to succeed.

MISS N. E. RYDING.

PROCESS WORK

By Stephen H. Horgan.

USING ENAMEL FOR ZINC ETCHING.

In using enamel solution on zinc I introduce as much chrome alum into the solution, when mixing, as the glue will take up without jellying. Then, when the print is made and developed completely, I soak the plate for a few minutes in a saturated solution of common alum. After removal from the alum solution and a slight rinsing off, the plate is slowly dried and is ready for burning in. This is all the precaution taken to harden the enamel and cause it to adhere firmly to the plate during the etching. Of course, the necessary precaution was taken to have the plate free from grease before flowing the enamel solution on it. Beside polishing the plate with fine charcoal, it should be rinsed with a strong solution of lye and washed under the tap before applying the enamel. The lye renders the plate alkaline and causes the enamel to stick better. A writer in the *Process Photogram* suggests the following to accomplish the same result: Never grain the metal, as graining makes it more difficult to wash out, and the enamel softens up much easier in the etching bath. Instead of etching in acid and plain water, make up a bath as follows:

Saturated solution common alum	40 ounces.
Nitric acid	1 ounce.

When the etching has fairly started, the plate must not be touched with the etching brush or anything else. If the oxide is required to be moved so as to see the depth, it must be done by rinsing under the tap. During the first etch the plate may be removed from the bath, rinsed, and dried over a gas stove at least three times. This hardens the enamel again and gives it a fresh lease of life. Thin enamel for coating the plate will always soften in the bath, so make it as thick as it is possible to work with.

Color has heretofore been the stumbling block for the photographer. For the three-color process worker it would appear as if he could not get subjects sufficiently free from color. There is a portrait of Ada Rehan being used for advertising purposes in New York. It is a portrait in color from life, and is rich in red and yellow, giving the subject a show-case, wax-figure look, while it is deficient in the cold blue or key block shades that were formerly easiest to obtain. It is such a bound from the monotones to which we have become accustomed to the exaggerated tints that the color process man is now giving us, that the results startle us. When the process man learns to control color, and our eyes become trained to seeing it, we will not be satisfied longer with mere light and shade.

SYNCHROMIE.

The mysterious method of multi-color printing that rumor says is being patented in every country by its inventor, Count Vittorio Turati, of Milan, is called by him "Synchromie." The process world has been on the tip-toe of expectancy for many months, awaiting the long-promised description of this invention. Only vague paragraphs have been published about it, telling of the distinguished visitors to Count Turati's laboratory, who have been permitted to see a steam press turning off these synchromie prints at the rate of nine hundred copies per hour. The latest report has it that these prints contain as many as seventy different shades of color, all produced in two impressions and by one passage through the press.

A solitary exhibit of synchromie has found its way to this country, and from it a guess will be hazarded as to how the work is done, and, if not, how it might be done. The print at hand is a reproduction of a painting. The first printing shows numerous delicate tints of color, while the second printing is from a half-tone block printed in a gray or light brown ink. This latter block is merely a good half-tone made from an orthochromatic negative. Now as to the color block. There is no reason why it should not be produced by a system of mosaic for which the Italians have been famous. Imagine, if you please, instead of making of glass or stone the small pieces called tesseræ, of which mosaic is composed, that they be made in this way: That the pigment be mixed with a little wax and grease and be made into sticks, something like colored lithographic crayons; or by another method, aniline dyes could be used, formed into tesseræ of various shapes with gelatine or gum and a little glycerine. Now, to make a multi-color printing block, these tesseræ of wax or gelatine are set on end in a galley, after the manner of type, the guide for color and design being a color sketch on the galley on which the mosaic picture is constructed.

When this mosaic is complete, it is locked up like type, and is ready to be printed from after the surface has been shaved perfectly smooth. If this mosaic is made entirely of wax or greasy tesseræ, then the printing is done by laying on a sheet of paper and pressing it in contact with the block by means of a hot platen. This liquefies just sufficient of the oil and wax in the mosaic to be absorbed by the paper. Should the mosaic be made of gelatine and glycerine tesseræ, then the paper must be applied damp to the mosaic, when the pressure will cause it to absorb sufficient of the aniline color. In either case the paper is covered with patches of color of varying tints, which become connected and take form as soon as the half-tone key block is printed on top of them. It is to be expected that such a color block will wear down while it is being printed from. It is but necessary to have an arrangement for keeping it up to an even printing surface, and the length of time the block will wear will only depend on its thickness.

PHOTO-LITHOGRAPHIC TRANSFER PAPER.

Mr. Thomas G. Lee is responsible for the following method of preparing photo-lithographic transfer paper, which is condensed from several pages of the *Process Photogram:* Two ounces of Nelson's No. 2 gelatine are soaked for an hour in 25 ounces of cold water. At the end of this time the vessel containing the gelatine is placed in a pan of boiling water. When the gelatine is dissolved, the pan is placed over heat, and the water surrounding the gelatine vessel is just allowed to boil. The gelatine is then filtered through very fine muslin into a warmed dish a couple of inches larger each way than the size of the sheet of paper to be coated. This dish should stand in another, which is kept filled with hot water. The paper sheets are first floated on a dish of clean warm water until quite limp. The excess of water is then blotted off and the paper is floated—wetted side down—on the warm gelatine solution for three minutes, avoiding bubbles, after which the sheet is raised and squeegeed to a sheet of plate glass, upon which it is allowed to dry. The glass must have previously been well cleaned and rubbed over with talc, the excess of talc being dusted off. Dried in this way, the paper leaves the glass when dry with a beautiful surface, which is capable of giving the finest lines in the negative.

To sensitize this paper it is floated on the following solution :

Albumen	7 ounces.
Saturated solution of potassium bichromate	4 "
Ammonia, .88	200 minims.

When the gelatine paper has floated for two minutes on this solution, it is raised and laid on a level slab for five minutes, and afterwards hung up to dry. When dry, the paper should be used as soon as possible. The unsensitized gelatine sheets will continue in good condition for a long time if packed together flat and kept in a dry place.

APPLYING ENAMEL FILMS TO METAL ROLLERS.

Mons. A. Villain has won a prize of £5 5s., offered by the *Process Photogram* for the best practical article on a photo-mechanical subject. The prize article is running as a serial in our esteemed contemporary under the title : "Attaching a Film Resist to Metal Plates or Rollers."

Herewith is a brief summary of the process : A sheet of paper coated either with gelatine, gum, albumen, etc., is sensitized on a bath containing ammonium bichromate. After drying in a darkroom it is exposed behind a non-reversed line or half-tone negative. After sufficient exposure, the image is developed with cold or tepid water. Then the image is brought into contact, image downwards, with the metal roll plate. The excess of water and air bubbles interposed between the two having been driven out, the whole is dried and then heated over gas: the paper burns away, leaving the image in contact with the metal, and all that remains to be done is to etch the metal in the usual way.

To go a little further into the detail of novel points in this method, it might be added that the paper used in this process is one coated with a 2 to 5 per cent. gelatine solution. Paper used ordinarily for double transfer in the carbon process is said to have given very good results. This paper is dipped in the following sensitizing bath:

Distilled water	60 cubic centimeters.
Egg albumen	40 " "
Ammonium bichromate	3 grams.

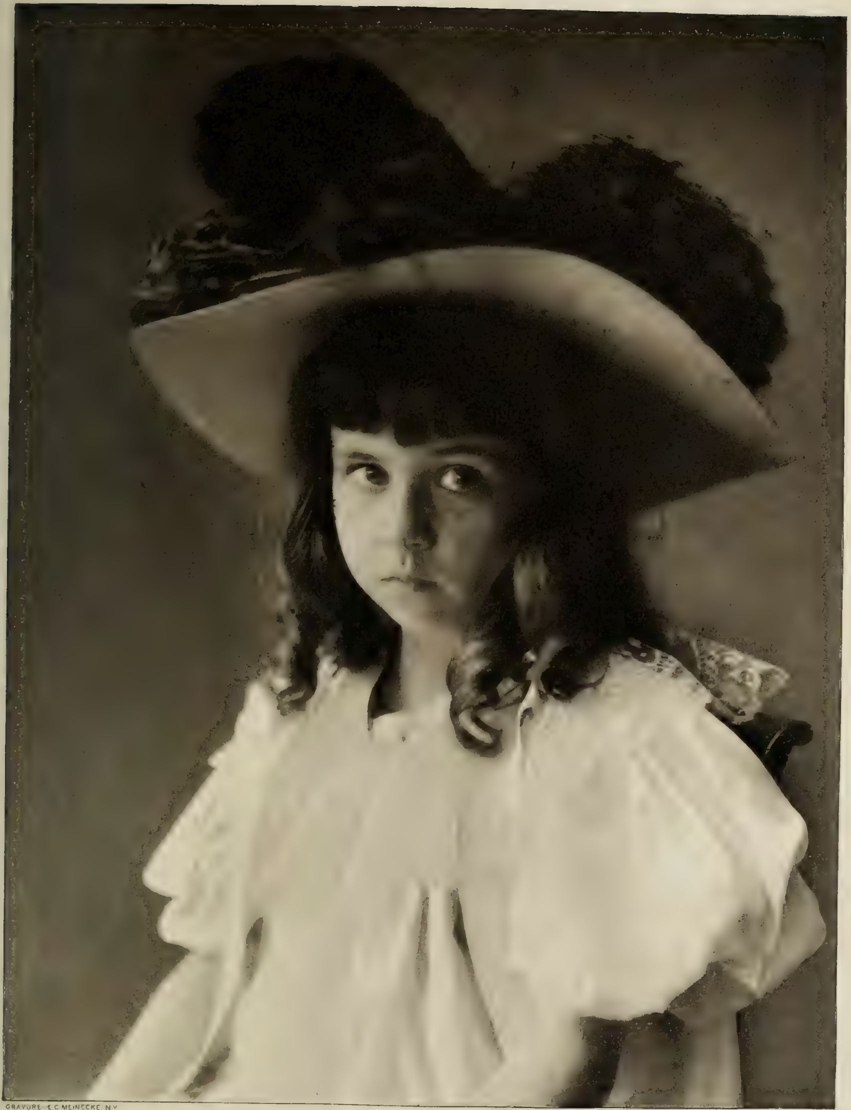
When dried this sensitized tissue is exposed to light under a non-reversed half-tone or line negative. When exposed long enough to light it is developed in cold water containing a little aniline dye, to see better what results are being obtained. When the development is finished and all the detail has been brought out perfectly, the print, while still moist, is transferred face downwards to the brass or copper roll and allowed to dry. The baking of the gelatine is carried out in the same manner as for the enamel process. The roller is revolved over a row of gas jets, the heat raised by degrees until a temperature of 340 to 400 degrees Cent. is attained. The roll can be withdrawn on arriving at about 340 degrees Cent. if the paper is destroyed. The heat must be continued until a complete destruction of the paper is brought about.

To control the temperature, little pieces of lead can be placed on the edges of the roll that is being heated. Other metals or alloys can be employed according to the temperature desired. The required temperature being obtained, the roll is left to cool very slowly. A piece of dry or moistened rag is used to remove the particles of charred paper which remain attached to the enamel. The design on the roll is now carefully examined, and retouched, if necessary, when it is ready for etching.

This process is certainly an ingenious one, and suggests numerous applications. Designs can be photo-engraved by this means on the surfaces of unwieldy metal bodies, or on curved metal surfaces like gun barrels or bicycle posts. Of course its principal application will be to the preparation of rolls for printing fabrics, wall-papers, etc.

A METHOD OF ETCHING VERTICALLY.

If there is any single discovery that process men desire most it is a mordant or method that will etch a metal plate vertically, and not sidewise. In old days we were told of etchers who possessed such a secret, but they usually carried the treasure to the grave with them. But now Mr. Thomas Bolas, who always writes so interestingly on process subjects, tells of such a method of etching as if it were an accomplished fact. He says: This vertical method of etching is due to an observation of Gourdon to the effect that if a thin deposit of finely divided



GRAVURE E. C. MEINECKE N. Y.

MY NIECE DOROTHY.
BY R. EICKEMEYER, JR.

platinum be produced upon zinc, the platinum will form the negative plate of an electric couple, and the zinc under this deposit will be slowly dissolved away even by so dilute an acid as 1 volume of sulphuric acid with 7,000 volumes of water, and in such a case the etching is almost perpendicular to the surface, the tendency to undercutting being practically nothing. Gold may be used as well as platinum; a solution of the chloride containing about 1 part in 2,000 is flowed over the plate bearing the fatty image, after the whites have been cleaned as perfectly as practicable. A dull deposit forms instantly on the zinc, and, after a rinse with water, the plate may be at once placed in the highly diluted sulphuric acid. Here the etching will proceed with extreme slowness and regularity. As the zinc dissolves away, the gold or platinum deposit descends and adheres. This method, though extremely slow, gives an almost vertical edge, and may be especially valuable in making originals from which type founders' matrices are to be produced.

Some years ago the idea occurred to me for intaglio etching that a thin film of gold or platinum deposited on a zinc plate would protect the zinc so covered. I experimented with gold and platinum films of various strengths, and found this to be the drawback to the method, that the galvanic action was strongest at the points where the two metals joined, and consequently it was impossible to prevent lateral etching. It may be that my etching baths were too strong, and I failed because I used nitric instead of sulphuric acid. But I must confess to being skeptical as to this method of solving the problem of vertical etching, and should like to have others try this suggestion of Mr. Bolas and report results.

PROCESS HINTS.

Now that process dry plates are coming into use it would be wise to have a piece of cardboard the size of the dry plate used, and covered on one side with black velvet, to back the plate up with and prevent halation. Sometimes the brass spring on the plate-holder door becomes so polished where it presses against the glass that it reflects two bright spots of light that, if noticed, are usually attributed to "dirt in the glass." The black velvet, or other light-absorbing backing, prevents all such trouble.

WANTED, A PROCESS DRY PLATE OVEN.

It seems strange to talk of a gelatine dry-plate oven, and yet that is what we have got to have. It was all very well for portrait photographers and other previous users of gelatine plates to wait hours for them to dry, but process men never will. Time is money with them. The time required in drying gelatine negatives is the chief obstacle to their more general use. Hence the necessity for an oven. Necessity being the maternal ancestor of invention, it is to be expected that her next progeny will be in the shape of a drying oven for dry plates.

When I worked at photo-lithography we had a closet of very shallow drawers, like the cut cabinets in a printing office. The bottoms of these drawers were made of strong galvanized iron wire. In every second drawer was laid wet blotting paper, and in the intervening drawers were placed the photo-lithographic transfers it was desired to dampen. It was astonishing how quickly the transfers absorbed moisture from the wet blotters, an inch away, above and below them.

Now, why cannot this dampening operation be reversed, substituting chloride of calcium for the damp blotters, and placing the gelatine plate on the shallow wire trays between the chloride of calcium layers? A small electric fan can be arranged to force a current of air through such a box. A gas flame might be used to dry and heat the air slightly before forcing it through this closet. As rapid evaporation produces cold, the more rapid the evaporation of the moisture from the gelatine plates, the more heat can be applied to the air entering the closet, and hence the name oven.

Through the use of a bath of formalin after fixing, all danger of frilling will be overcome.

WHEN extra clean glass is wanted for photographic purposes the following will be found the very best glass-cleaning mixture it is possible to make, according to *The Photographic News:*

Powdered pumice stone	1 ounce.
Powdered chalk or whiting	1½ ounces.
Ammonia	½ ounce.
Soft water	1 "

Apply with a piece of wash leather, and polish with a piece of rag or soft paper. Dirt will vanish as if by magic.

WATKIN'S meters, to gauge the exposure, are instruments that would be invaluable to process men were they but acquainted with their use. It will pay to write to E. & H. T. Anthony & Company for particulars regarding them.

COLLOTYPE.*

COLLOTYPE is the art of printing in the manner of a lithograph from a film of gelatine which has been made selective in its taking up of a greasy ink by the action of light.

The first principle on which collotype depends is the principle involved in lithography, *i. e.*, that a surface containing moisture refuses to take a greasy ink, whereas the parts of the surface which do not contain moisture take the ink freely. The next thing to note is that gelatine, when treated with a chromic salt and exposed to light, undergoes a certain change by virtue of which it does not absorb cold water, whereas the unaltered gelatine does so. Where, therefore, the surface has been exposed under a negative, the shadows which have been acted upon by light take on a condition wherein the gelatine refuses to absorb water, the parts which have been shielded from light remaining unaffected, and absorbing freely; so that if the chromium salts are washed out, we get a condition of things very like that of the lithographic stone on which a design has been traced with a greasy ink. The first difficulty that occurred in endeavoring to apply these principles to the production of a printing surface was this—that the gelatine was found not to adhere to the support to which it might have been attached, but to strip off along with the inking roller; it was necessary to have some surface as a support, and, whatever surface the gelatine was poured on to, the water soaked through the gelatine to the back and loosened the attachment, so that, when the roller was passed over it, the whole of the film came up. Albert, of Munich, overcame that difficulty in a very ingenious way. He coated plates first with a mixture of bichromate and gelatine, and a certain quantity of albumen; this was dried, and the plate exposed to light through the back, by placing it on a black velvet cloth, glass side to the light. By this means the surface next to the glass was rendered so hard that the water did not soak quite to the back of the film, and consequently after washing in warm water an adherent substratum was formed, the back of which was quite hard, while the gelatine on the surface remained in a soft, spongy condition. A new sensitized film of bichromated gelatine was then applied, and adhered thoroughly to the soft upper surface of the substratum.

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* From *The Photographic Journal.*

That was a very good process, and was worked with great success, but it was found more convenient to adopt some substratum which would be independent of a light action. Such a film was successfully made by a mixture of water-glass (silicate of soda) and some organic matter. The organic matter at first used was white of egg, but it was not long before a compound was found to substitute it—ordinary ale, which has an advantage over white of egg in that it does not froth so continuously. Ale contains some glutinous substance in just sufficient quantity, when mixed with the water-glass, to give the desirable porosity of film, and, in fact, a film which answers very well as a support for the sensitive surface.

The great enemies against which a collotyper has to guard are dust and air bubbles. The various safeguards and precautions which will be detailed are intended to ensure regularly successful work, and although I am aware that some one of them may be dispensed with by certain successful workers and some by others, it is advisable, at all events for the unpracticed, to omit nothing which tends towards the perfection of the work.

The support on which the collotype solutions are spread is plate glass, which may conveniently be of $\frac{1}{4}$ or $\frac{3}{8}$ of an inch in thickness, and should be large enough to leave a margin of at least 2 inches on each side of the printing surface. The sharpness of the edges should be taken off by grinding, and on the upper side it is well to grind away the edge, until there is a bevel. When for use in a press furnished with grips, the bevel is ground both deep and true along the sides and ends.

The first thing to do is to prepare the glass to receive the coating of water-glass and beer, and this is done by grinding. If the glass has already been used for collotype and has to be used again, the old film must be very thoroughly cleaned off; this is often done by immersion in a stoneware trough containing strong sulphuric acid, but sulphuric acid is not nice stuff to have about, and another solution is found to answer just as well, namely, caustic soda, prepared extemporaneously by mixing a solution of ordinary washing soda with lime. If, however, the plates have not been used before, it is simply necessary to grind them. A pair of plates is ground by placing them on a flat surface and grinding them together with fine emery powder, called emery flour, and a little water between. If, in grinding new glass, you find one or two places remain bright, that shows the glass is not quite flat, and you may then expedite the work by using a coarser emery—say 120—finishing off with emery flour to produce a finer surface. When the plates are properly ground the powder may be brushed off under a tap, being careful to thoroughly wash the edges, in the roughnesses of which a little powder is apt to stick.

When dry the plate is coated with the water-glass mixture—

Water-glass	1 ounce by measure.
Crushed caustic soda	30 grains.
Beer	15 ounces by measure.

Caustic soda is not always used, but it is a desirable addition, particularly if the beer is in the slightest degree sour; if the beer begins to cloud almost directly after filtration, you may depend upon it that in the course of drying on the plate it will throw down particles which it is undesirable to have. Ordinary "four ale" is often used for this purpose, and I have used it with great success. Beer, however, which may be depended upon, is "Pilsener" beer, as may that which I am using for my demonstration, "Spaten" beer. It is desirable to filter the ale several times to get rid of gas, and a good plan is to pour it many times from a height from one vessel to another. A material which is very useful as a preliminary filter, and in several departments in collotype is that sold as "butter cloth," a soft muslin without dressing. If the beer is acid, more caustic soda may be added. The final filtration is through filter paper. To prevent the formation of bubbles in filtering, it is desirable to place the funnel at such a height, and in such a position in the receiving vessel, that the mixture trickles down the side instead of falling in drops.

The next operation is to coat the clean glasses with the beer mixture. There are many ways of doing that. I have often held the plate in my hand and poured the mixture from a jug, but we will do it in what is now a more usual way, and is certainly more convenient for large plates. The glass is leveled by means of a leveling stand and a spirit level, and stands over a large porcelain dish. Having removed any bubbles or scum which may be on the surface of the mixture, carefully dust the plate by lightly passing a broad soft brush over the surface, and then pour a pool of the mixture on the glass, covering the surface of the plate along the edge nearest to the operator, and by means of a bow made of cane and catgut, push a wave of it all over the surface – do not drag it. That is to say, do not let the gut scrape the dry part of the glass. Indeed it is best not to let it scrape anywhere except at the extreme edge of the plate, where it may touch to ensure the liquid flowing up to the edge. The surplus solution is then poured off, and the plate stood in a rack to dry. In dry summer weather no artificial heat need be used, but if the weather is cold or moist the plates should be dried by gentle warmth. For draining and drying, ordinary plate racks may be used, but the grooves must, of course, be broad enough to carry the thick plates, and it is helpful in preventing dust to tilt the plates so that the coated side is a little downwards. This can be conveniently done in an ordinary household plate rack.

We will now prepare the actual sensitive coating. Here is some gelatine, 1 ounce, which has been soaking for an hour or so, and then drained; the gelatine should neither be of a very hard nor very soft kind. What is known as "middle-hard" by Creuz is what I am now using. The water that this has been soaked in has been boiled and allowed to cool before the gelatine was put in it, in order to minimize the risk of bubbles by getting rid of the air from the water. To 1 ounce of gelatine thus swelled in water I add 2 ounces of a 10 per cent. solution of mixed bichromates of ammonia and potash, and then I place the jug containing the mixture into a vessel of hot water for the gelatine to melt. When melted, the solution is made up, if necessary, with water to 12½ ounces; I add also half a dram of ammonia to the bichromate solution, and 1½ drams of a 5 per cent. chrome alum solution, which is useful for hardening the gelatine, and forming the particular grain which it is desirable to have. While pouring in the chrome alum solution, the mixture must be briskly stirred.

The filtering apparatus for this gelatine mixture is a saucepan with a hole in the bottom into which a spoutless tin funnel has been soldered, and by putting hot water between the funnel and the saucepan the gelatine solution is kept in a liquid condition.

Before the gelatine solution is finally filtered it should be strained through a double thickness of butter-cloth, which gets rid of the coarser particles and prevents the filter paper from being quickly clogged. Another method of filtering is to put the solution into a vessel like a lamp chimney, with a piece of wash leather tied over the base. Through this the solution is forced by air pressure from a tube and bulb passed through a cork in the top of the glass, but I do not think there is anything better than filter paper for the purpose. Having filtered the gelatine mixture and carefully dusted the plate as directed for the first coating, we coat the plate as before, using a similar catgut bow, but not the same one as was used for the beer and silicate solution. For this operation the plate need not be leveled so carefully as when it is put in the drying cupboard, as the only object in leveling now is to prevent waste of the solution by spilling it. A help in avoiding bubbles and scum which I saw in use at Albert's and am using now, is to keep a jug of the coating mixture quite full standing in warm water for some time, and immediately before use blow off the surface liquid into another jug or into the filter. Many workers measure the quantity to be used in coating, and there is something to be said in favor of this plan, and something against it. If it is not measured, of course we cannot be certain that we have exactly the same thickness of gelatine on each plate; but, on the other hand, if it is not measured, we can pour on sufficient to allow of some being swept off, and that helps to get rid of bubbles and dust. The surplus solution, as with the water-glass mixture, may, after filtration, be added to the stock. The two ends of the bow cord must not touch the solution at the same time, or there would be a scraping action which is prejudicial to proper coating; when coated, the plate must be placed in the drying box and left there for an hour or so, during which time the box must not be opened or the plate would be spoiled. A method of coating which is a good deal used, and which may have the balance of advantages for very large plates, is to pour on the solution while the plate is in the drying box itself. With this method of coating, a glass rod, bent in a triangular form, is generally used instead of the bow. The objections to the plan are, that it is not so easy to detect air bubbles or dust in the solution when poured on, or to remove them by flooding with a fresh quantity. A thick film prints slowly under a negative, and a thin film, although printing quicker, is apt to print black all over. The quantity of solution left on the plate should be about 1 ounce for a 12 x 10 plate. If you adopt the measurement plan once or twice you will see what the thickness of film should be, and you will then know what appearance a film of suitable thickness presents when coating without measurement afterwards. The sensitive solution is not costly, and it is not advisable to keep it, although I have sometimes used it without ill effects the day or even two or three days after mixing. If the coated plate is kept, the film becomes harder and more liable to take ink on the lights; but, on the other hand, it is rather more of what is called "grain," which makes the plate nicely workable, and gives the half-tones very well. Mr. Wilkinson recommends preparing plates in pairs and storing them face to face, which seems reasonable. Some authorities, however, have said that nothing whatever should touch the surface, but, perhaps, it had not occurred to those workers to consider the effect of contact with a like body. Any damp on the surface would, of course, be destructive.

The drying box, or oven, is a box the bottom of which is made of sheet iron, and on that bottom is a sheet-iron dish turned upside down, which forms a false bottom, so that the heat shall not radiate too strongly in any particular plane. Across, near the top, are wooden bars supporting a grill, which is tapped and fitted with screws, points upwards, accurately brought to one plane. In this particular box the screws for leveling are outside, and before the plate is coated it is placed in the box and carefully leveled. It is well to note which edge of the plate lies to the front during the leveling process, and replace it in the same position after coating. The plate is left in the drying box until thoroughly warm, and then coated.

The great points to be observed while the plate is drying are, that it must be preserved from draughts, from dust, and from shaking. Even walking about ordinary flooring in the vicinity of the box will cause wavy marks; if possible, it should be let into a corner where there is a stone floor, and consequently little risk of vibration. It has sometimes been found impracticable to carry on collotype work at all, by reason of the proximity of machinery to the drying box, the tremor communicated to the plate during drying causing lines and markings upon it. The lid of this box is a frame lined with muslin and covered with black calico, materials which allow a certain amount of moisture to pass through; and there is a thermometer fixed in it with a scale sticking up, so that it can be read from the outside. The plate should be dried at a temperature of from 120 to 130 degrees Fahr. The temperature at which the film is dried will affect the nature of the grain. If the drying box is kept at about 110 degrees, there is scarcely any grain, while at 140 degrees there is almost too much or too coarse, and the best temperature in most cases is between 120 and 130 degrees. The chrome alum also assists in the formation of grain.

The next thing to be considered is the preparation of the negative for printing. It is desirable to have at least 2 inches of white margin all round the plates, and this is secured by putting a border of tinfoil on the face of the negative. Paper is too thick for this purpose, as it would prevent contact between the plate and the negative, and there would consequently be no sharpness. If an ordinary negative is used, the final print will be reversed, which in some cases does not much matter; but if an unreversed print is required, one of several things can be done. When negatives are specially taken for collotype, a prism is generally used with the lens; when this has not been done, an ordinary silver print can be made and copied with a prism so as to obtain a reversed negative, or a copy can be taken on a collodion plate and the film stripped off, and the same plan can be adopted when the original negative is taken on a collodion plate. The stripped film method is that most commonly utilized. The plate is prepared with a waxing solution, coated with collodion, and the negative taken by the bath process. When it is thoroughly washed, a solution of gelatine with a little glycerine added is poured on, and in the course of the next day the film should be dry and can be stripped off. Another way is to squeegee a piece of sheet gelatine on to the gummed surface of the film, by which means you can get your films all of one thickness. A great convenience of stripped films is that you may use a large collotype plate for as many subjects as it will hold, covering the joints with tinfoil.

Printing is sometimes judged by examination from the back, but the actinometer method is to be preferred, and a very simple actinometer, which anyone can rig up, is formed by a negative which is taken as a standard of unity. A slip of silver paper is printed from this simultaneously with one from the negative for collotype. The time occupied in printing will of course depend very much on the negative, but it may usually be taken that the exposure will be about three times that required for a silver print. When printed, the plate is taken from the pressure-frame and allowed to soak in cold water for an hour or two, until you can see no color whatever in the light parts, and only the merest trace of color in the shadows, and when thoroughly dried it is ready for the printer.

There are two or three ways of printing. One is simply to damp the plate as a lithographic stone is damped, dabbing off the moisture from the film—but not wiping it—until you can see no shining spots of water, and then begin to ink; a much more common method is to pour on what is called an "etching solution," generally composed of glycerine and water and a little salt. The following makes an ordinary sort of solution:

Glycerine	5 ounces.
Salt	1 dram.
Water	3 ounces.

The plate is leveled and the solution poured on deep enough to make a pool all over it, and there it may stand for a few minutes or an hour or two; if much printed, a rather long soaking is necessary. The use of this solution enables many prints to be pulled without re-damping; whereas, if the plate is simply damped with water, it must be re-damped for each print. With the etching solution you may, without stopping to re-moisten, get from twenty to fifty prints from a hand press, or as many as one hundred and fifty or even more by machine printing. There are two reasons why machine printing gives so many more prints than a hand press; in the first place, the work is so much faster that more work is done before the moisture evaporates; and, in the second place, the paper in machine printing is only in contact with the plate for a very short time, and consequently very little moisture is absorbed by each print. When the plate has been "etched" for some time, the solution is removed with a sponge, and after finally dabbing the plate with a soft cloth, the rolling may begin.

The etching solution may be used repeatedly, being strained through muslin after each time in order to keep it clear. The press used for the demonstration is an ordinary lithographic press. Presses are especially made for collotype, resembling good litho presses, with the addition of an appliance for steadying or grasping the plate. When using a litho press a litho stone, somewhat larger than the collotype plate, is laid on the bed, and the plate is secured on the stone, either by bedding with plaster of paris, or, as I am now doing, by means of a pair of long clips which bind on the edges of the stone close to the ends of the plate, and are secured by wedges driven in against the edges of the stone. Other suitable mechanical appliances may of course be adopted.

The water or etching fluid being sponged off, and the surface moisture removed by dabbing with a piece of butter-cloth until no more glistening specks of moisture can be seen, a litho roller, charged with a somewhat stiff ink, is passed over the surface. The ink is what is known as a lithographic chalk ink, and it is desirable to use a high quality. It will probably be a little too stiff as sold, and is thinned by the admixture of a very small quantity of lithographer's varnish, which is, essentially, thickened linseed oil. After rolling in this ink, the half-tones will generally be too faint, or not show at all in the lighter portions. The plate now receives a second inking with a somewhat thinner ink, applied with a glue roller, such as is used for letterpress.

Various kinds of paper may be used, but it must not be of a soft and spongy character, otherwise it may split up, leaving part of it adherent to the plate. The best to use for most purposes is some prepared with an enamel surface expressly for collotype. Inks of various colors may be used, and if it is desired to represent the glaze as well as the color of a print upon albumen or gelatine paper, the print is floated upon a varnish of bleached lac dissolved with the aid of borax or of ammonia and alcohol as in the following formula.

Two ounces of powdered bleached shellac are dissolved in a mixture of 6 ounces of alcohol, and 5 ounces of strong ammonia. Ten ounces of boiling water are added little by little with constant stirring. The solution is afterwards filtered two or three times. For the final filtration a material known as nainsook is suitable.

If any bubbles are formed in varnishing they may be removed while the solution is still flowing by touching with a sable pencil dipped in the same liquid.

The management of the rolling and of the press is rather an art by itself, and the photographer who thinks of taking up collotype would do well in the first instance to obtain the assistance of a skilled lithographic printer until he has acquired some practice in this part of the work.

The process of inking the collotype plate and pulling proofs was then demonstrated, in the course of which, in answer to questions, Mr. Debenham said:

An ordinary copying press cannot be used for anything larger than a quarter plate, as it does not give sufficient pressure to pick up the ink, but it can be utilized for a modification of collotype known as the photo-auto-copyist. Any good negative will do for collotype printing. If the negative is weak, the plate may be improved by inking it and pouring on the so-called "etching solution," with the addition of a little ammonia, in which case the shadows, being inked, are protected, while the lights are cleared up, and a fairly vigorous print may thus be obtained from a weak negative. The negative should be as free from spots as possible, but something may be done to remedy them on the collotype plate. If there are white spots in black places you may grind up a little black color with a solution of tannin and just touch the plate with the mixture, when the tannin will so harden the gelatine that it will take the ink. It is desirable, when doing this, to ink the plate first, because the white spots can then be easier seen, and the ink protects the surrounding parts from spreading of the tannin solution. W. E. Debenham.

PHOTO-LITHOGRAPHY AND PHOTO-ZINCOGRAPHY.*

THE earliest account of a process of photo-lithography is that of Joseph Dixon, who, in 1841, copied bank-notes by mixing gum with potassium bichromate, spreading the mixture on a lithographic stone, exposing to light through a bank-note and inking up the exposed stone and printing proofs in the usual way. Early in the sixties photo-lithographic transfers were used, but of late years they have, to a large extent, gone out of use, simply because of the want of a good understanding of the requirements of a good lithographic transfer, and also on account of the method adopted of inking up, which always produces transfers yielding dirty whites and the unsuitable coating on the paper gave thickened lines.

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* From *The Photographic Journal.*

The first point which we must discuss to-night is, what are the requirements of a good photo-lithographic transfer? To begin with, it is necessary that each line be sharp and solid, and that when the transfer is damp for transferring, the ink lines must not be raised above the surrounding whites—*i. e.*, there must be little or no relief, while at the same time the gelatine coating must absorb sufficient moisture to cause it to adhere to the stone the first time it is pulled through the press. In the old days the paper was made at home, and the bichromate and the gelatine were mixed together. There was no care taken as to whether the gelatine was boiled to death or whether it was simply dissolved, and the paper was coated with a brush—first one way and dried, and then the other way and dried again. Any one who has studied the behavior of gelatine in connection with the bichromate salts will know that that is not the best way of working gelatine. The first improvement was made when Husnik introduced his paper for photo-lithographic transfers, and from that time a slight reaction set in, and very good transfers were made upon that paper. Unfortunately, however, it occurred to Husnik to improve the paper, and he "improved" it with a vengeance; he utterly spoiled it, and the thing died again. After some investigation, I hit upon a paper which, for this purpose, is perfection itself, although it is prepared for quite another process: I allude to the double-transfer paper of the Autotype Company, which, if floated upon albumen and bichromate and dried, really gives an ideal transfer, as it gives very little relief, will carry very little (but amply sufficient) ink, and in the press has a perfect grip on the stone. The preparation of the paper is very simple. The bichromate solution must not be too strong and the paper must not be dried at too high a temperature. If when dry it has the slightest brittleness about it, it is of no use and will not produce good transfers. There are two ways of drying the paper. One method, adapted for what may be called commercial work, where a good deal is done and time is limited, consists in immersing the paper in a solution of bichromate until it is limp, but not until it curls outwards. It is impossible to give a time limit for this operation, because if the solution is at 60 degrees the paper may safely be left in it for two minutes, but if warmer or colder, the period of immersion will vary. When removed from the bichromate the paper is gently squeegeed on to a sheet of glass, wiped with a clean rag, stripped off and hung up to dry in a well-ventilated oven heated to not more than 70 degrees. The other method is to allow the paper to remain on the glass, in which case it may be dried in the dark in an ordinary room. When stripped off it will have a fine surface, and one can dispense with very heavy screw pressure frames for ensuring contact between the negative and the paper.

The question as to how long the paper will remain in good condition is determined by the manner in which it is sensitized and dried. If sensitized in a 1 per cent. solution it will keep longer than if sensitized in a 3 per cent. solution; but if sensitized in a solution of 1 per cent. of bichromate, you introduce a number of difficulties.

The exposure to light under the negative is a very simple operation, and if you are only doing small transfers you can judge the exposure by examination if you exercise a little care. It is always best, however, to use an actinometer, and for this purpose there is nothing better than a piece of a line negative in a quarter-plate printing frame. The negatives must have the lines perfectly clear, and the parts representing the whites should be as near opaque as possible. The wet collodion process gives such negatives with the greatest ease, but at the present time we can get process plates which with care will give the same results. The exposure to light must be continued until there is a well defined image on the transfer paper of the color of the print which I now send round.

After exposure comes the question of inking, and this is one of the rocks upon which the old photo-lithographers used to split. The original method of inking up a transfer was a very ridiculous one. The transfer ink was thinned down with palm oil or some other oil, and the lithographic stone was rolled over with this greasy ink until it was covered with a thin, even film, when the transfer was laid on the inked stone and the whole pulled through the press. By this means the grease was forced into the paper and it was almost impossible to get a clean transfer. Another process of inking was introduced, I think by Husnik, and in many respects was not much better. The ink was placed on the slab and thinned with turpentine and then rubbed all over the transfer. This plan gave no control over the quantity of ink that was used, and this brought about another fault, at which the photographer grumbled—the lines were impaired. The modern way of inking up a transfer, for the introduction of which I may take credit, is very simple and quick, and is economical so far as the ink is concerned. The ink is thinned down on a slab with turpentine, and the print is laid upon a board and is held in position by a hinge ; then take a glue roller and use it to roll the ink over the transfer, continuing until the turpentine has evaporated and there is a thin and even film of ink. The transfer is then soaked in water for a short time, after which the ink is rubbed off by means of a wet pad of cotton-wool. For the purpose of this demonstration I am using the specially manufactured photo-lithographic transfer paper, which is sensitized in—

Bichromate of potash	1 ounce.
Water	20 ounces.

For my own use, however, I prefer the double transfer carbon paper, which I sensitize in—

White of ten eggs.	
Bichromate of potash	2 ounces.
Water	30 ''

The question arises, which is the best bichromate to use ? For photo-lithography, like collotype, I find the bichromate of potash is the best; bichromate of ammonia is uncertain in its action, especially in damp weather; the addition of a little liquid ammonia to the bichromate of potash certainly helps the ink coming off. When the ink has been cleaned off, the transfer is blotted and pinned by its four corners on to a board to dry, care being taken not to stretch it. Having been dried, it is trimmed and placed in a damping book until damp; it is usually tested by putting the tip of the finger on it, and if the finger adheres the transfer is ready for transferring.

The next thing to pass on to is photo-lithography in half-tone; this is a process which has received attention for some years, and I think the first commercially practical method was introduced by Bullock Brothers. I have with me, and pass round for your examination, some sheets of paper prepared for the Bullock method, and which is photo-litho transfer paper that has been pulled through a press on an inked grained stone; I also show some prints on this paper from which you will see how the image is broken up. We have only discussed the use of gelatine in connection with photo-lithography, but others of the colloids can be used; gum tragacanth is very good for coating the top of the gelatinized paper, but gum arabic cannot be used at all, as it is almost sure to make its presence felt upon the stone.

The paper method is what is called the direct process of photo-lithography, but a plan sometimes adopted is to print the image on zinc and use that to pull the transfers from; the zinc may be either that used for photo-zincography, or thin zinc about the thickness of a Bristol board. In addition to that there are what are called the Hull zinc plates, prepared with a coating which looks like a sort of stone, upon which a print can be made direct by means of bichromated albumen diluted to about one-third the strength of the formula I have already given.

Half-tone with collotype grain is managed in two ways. One way is by coating paper with a thick film of gelatine mixed with various hygroscopic and reticulating substances, such as sulphate of zinc and chloride of sodium, and then sensitizing in a solution of bichromate of potash. Unfortunately, however, this process has no degree of certainty about it, and I have found it necessary to fall back upon the collotype grain on a collotype plate, and I pass round one or two transfers done from collotype plates. The method of preparation differs very slightly from that ordinarily adopted in collotype, the only difference being that you add to the gelatine a certain amount of a chemical which has a tendency to harden it, and you put a thicker film of gelatine on the plate. If you tried to get the grain by simply increasing the thickness of gelatine, you would find a difficulty crop up, in that unless your picture was very much over-exposed, you would not be able to etch it or damp it to get the ink to adhere. The grain may be differentiated to suit the subject, as the thicker the film the coarser will be the grain.

The best method that I know of for making half-tone transfers is the method of Pretsch. The formula is given in the next lecture, and if I want a fine grain I use 5 minims of solution per square inch of surface to be covered; for a medium grain I take 6 or 7 minims, and 8 minims per square inch gives a coarse grain; of course, the collotype plate must have been previously prepared with beer and silicate, dried and washed, and again dried. The best negative for collotype transfers is a thin one with plenty of detail, such as is recommended for printing in collodio-chloride and some of the newer printing methods; the exposure should be full, and the high lights ought to be just slightly tinted. Then you plunge the plate into a saturated solution of borax at about 90 degrees, rock it for a minute or two, leave it until the solution is quite cold, and then wash under a tap and soak in clean cold water until the whole of the bichromate is removed, which takes about all night. When this is finished the plate must be dried, and if the film is thick this operation may be accelerated by soaking in methylated spirits; when dry it is etched, and the transfers are pulled in the usual way. Ink up the plate in the ordinary way, and when you have pulled two or three proofs, you pull the transfers on good Scotch paper that is rather old, as new paper is apt to stick to the plate. The process of transferring to stone lies within the province of the lithographer, and the only thing that need be said about it is that the stone must be perfectly polished and free from scratches.

Photo-lithography, too, is now very often done from grain negatives as made for half-tone photo-zincography; but in making negatives through a screen specially for photo-lithography, it is always best to use a stop a shade large, so that you bring up the high lights a little, as you then save a lot of touching up on the stone. This cannot be done if you are making negatives for photo-zincography, for in that case the dots must show everywhere or else there will be trouble with the etcher. For this class of work the transfer paper must be dried on glass so as to get a glazed surface, in order that there may be absolute contact between the negative and the print; the slightest bit of dust will show a black mark.

I will now pass on to photo-zincography. I pass round two negatives which show the character of negative needed for this process, and from which the prints are made on the zinc. When I began we had to polish the plates ourselves, but now that is done for you, and you have only to wash them with a little ammonia to get rid of any grease, and to put them into a mixture of alum and nitric acid until they are grained, which gives them a matt surface. The plate is then coated on a whirler with a mixture of albumen and bichromate—generally the white of one egg, 10 ounces of water, and 1 ounce of a saturated solution of bichromate of potash to which has been added a little ammonia. In this case I find that bichromate of ammonia is perhaps preferable to bichromate of potash, simply because here you want to wash away the whole of the soluble colloid. After exposure to light under a negative the zinc is inked up in the same manner as the paper, the ink being afterwards carefully washed away from the whites, leaving the picture on the metal in ink. The plate is then dried and dusted over with finely powdered dragon's blood; when the surplus has been removed the plate is put on a hot plate, which melts the dragon's blood and incorporates it with the ink, giving a good resist. There is very little to be said on the subject of photo-zincography in line, and we pass on to half-tone. Here I pass round two half-tone negatives made with Levy's screens, and from the negatives prints are put on the zinc in various ways. First of all, the albumen method can be used as for line blocks, reinforced with dragon's blood and heated and prepared for etching as before. That method was greatly in vogue until it was displaced by what is now called the fish-glue process, which is easily worked and which gives the best possible results. I pass round three zincs: (1) the zinc as it is developed, the color being due to aniline dye, which is used to enable one to see the picture; (2) the same thing with the image burnt in, *i. e.*, the fish-glue image has been carbonized by heat, and by that means made acid-resisting; and (3) is the plate etched and ready for trimming and mounting.

Fish-glue is not the only thing used for this process; I have lately been experimenting with gum and albumen, and I find that a mixture of a very bad sample of gum, dissolved in water to the consistency of condensed milk, with white of egg, and sensitized with bichromate of potash, enables one to give a very short exposure and wants very little dyeing. It can also be carbonized without taking the ring out of the metal; that is one of the points where the fish-glue process on zinc fails, because it makes the metal so brittle that it absorbs the ink and does not give the results that are looked for from the block, especially when fast printing is in question. I have tried various other colloids; tragacanth can be used, but it is rather brittle stuff, and it is very difficult to get into a filterable solution, so that my experience is that fish-glue and gum are the two best things at present. The proportions vary with the nature of the gum, but the solution must be of about the thickness of the ordinary fish-glue.

There are other methods of making blocks by the bichromate salts; for instance, there is the swelled gelatine process, which is especially useful for reproducing pen-and-ink drawings more exactly than is possible in zinco, but it will not do in these days, when an order is brought in at five o'clock and the block is expected to be ready by six. The washed-out gelatine process was much used in America a few years ago; and another method of utilizing the bichromate salts in photography is the dusting-on process, which is very useful for making reversed negatives for collotype.

In reply to questions, Mr. Wilkinson said he recommended Australian gum for use with albumen; it was very bad for sticking, but answered excellently for the purpose referred to. He could not compare prints from collotype transfers with direct collotype prints, as the former was simply intended to facilitate cheap and rapid reproduction. He thought the fish-glue process, either on zinc or copper, gave a better rendering of the fine half-tone in a photograph than any other method of printing from zinc that he knew of; a good formula was as follows:

Fish-glue	2	ounces.
White of egg	1	ounce.
Bichromate of ammonium	60	grains.
Chromic acid	10	“
Liquid ammonia	¼	ounce.
Water	2	ounces.

This should be mixed in the order given. The addition of alum to the graining solution caused a finer grain than would be produced by the nitric acid alone.

W. T. Wilkinson.

Paper that has been immersed in a solution of copper sulphate and dried is acted upon by light, the change being made evident by the action of silver nitrate, pyro, gold chloride or ammonium sulphocyanide.

Hans Klepp thinks that the markings or fog sometimes observed on sensitized celluloid films is due to the action of camphor vapor on the silver salt, this vapor being set free by electrification at various points, or by the action of the salts left in the film.

Lenses may be cleaned by rubbing them with cotton wool moistened with a mixture of distilled water, 2 ounces; alcohol, 1 ounce; nitric acid, 3 drops, and then polishing with wash leather.

OUR Reviewer.

In this column we endeavor to impartially comment on books, apparatus, samples of work, and the like, sent in to us for review.

THE claims of photography on the earnest consideration of the artist are well set forth in a book recently issued by Percy Lund & Co., entitled *Photography for Artists*, and written by Hector Maclean. Several prominent artists testify to the value derived from an intelligent use of the camera, and the author points out just where the chief value of the camera lies and just what troubles and falsifications to avoid. The book is excellently illustrated.

THE ELEMENTS OF A PICTORIAL PHOTOGRAPH, by H. P. Robinson, is a book that will be read with pleasure and profit by every photographer. Mr. Robinson has a style of his own that is at once interesting and instructive, and in this, his latest book, he gives directions which may well be followed to the letter. Illustrations give point to his remarks and the excellent get-up of the book furnishes a proper setting to the handwork of the master.

PRACTICAL RADIOGRAPHY, by H. Snowden Ward, is a timely and interesting little book, copiously illustrated and containing information which will give the novice a thorough insight into the subject without bothering him with unnecessary complexities.

IT is said that the frontispiece to the July issue of the BULLETIN is the best X-ray picture that has yet been published. Some few copies remain unsold.

THE QUAD CAMERA, with which the illustrations on page 2 were made, is a very complete and handsome box, and with it four exposures may be made on 3½ x 3½ plates, without the use of separate plate-holders and without reloading.

NOTES SUR LA PHOTOGRAPHIE ARTISTIQUE, by C. Puyo, published by Gauthier-Villars et fils, 55 Quai des Grands-Augustins, Paris. The house of Gauthier-Villars has published many highly valuable works on photography, and their latest, by C. Puyo, on artistic photography, is a model of excellence in printing and general get-up. That the author is an artist is shown by his work, and this is of such a character as to render the book of great value even to those who, not knowing the French language, cannot understand the reading matter. Such books as these are worthy of photography, and help to raise it to its proper plane.

JAHRBUCH FÜR PHOTOGRAPHIE UND REPRODUCTIONSTECHNIK FÜR 1896, by Dr. J. M. Eder. This annual is always welcome, being crowded with good things from the pens of the best authorities. The illustrations are particularly interesting, including Synchromie, a color print in one printing, by Turati; a three-color print by Husnik & Hausler; a four-color print, a ten-color print, a three-color reproduction by Beit & Co., and another by Buxenstein & Co.

PHOTOGRAPHY ANNUAL, for 1896, edited by Henry Sturmey, is a bulky volume of particular value because of the articles on the progress of photography during 1895. C. H. Bothamley has recorded the facts established in the science and practice of photography during the past year, and has done his work well. Albert Taylor writes on progress in astronomical photography, this occupying some seventy pages. This annual abounds in hints and information. Of the illustrations the underground mining pictures are very interesting. The three-color phusochrom print will also attract attention.

MESSRS. PERCY, LUND & CO. send us a copy of their *Directory of Photographers and Kindred Trades*, which we shall doubtless find very useful. It reaches the most out-of-the-way places, and should be on every publisher's desk.

ANTHONY'S

Photographic Bulletin.

EDITORS:

PROF. CHARLES F. CHANDLER, PH.D., LL.D.
FREDERICK J. HARRISON.

VOL. XXVII. SEPTEMBER, 1896. NO. 9.

BAS-RELIEF PHOTOGRAPHY.

THE photographer on the alert for novelties will find in the bas-relief photograph something which is of sufficient novelty to rivet his attention and provoke his curiosity. At the Convention held recently at Chautauqua many of these embossed or bas-relief photographs were on exhibition, and to say that they excited considerable comment is to put the matter very lightly. While it is true that photographs, until recently, have been produced on bulged paper with the idea of giving relief, the effects obtained cannot be at all compared with those shown at Chautauqua. In these the modeling of the face, and, indeed, the whole body, was exactly followed, and the result was as if a miniature plaster-cast of the face had been mounted and colored to imitate a photograph.

The method of producing these bas-relief photographs is the subject of a patent, from which we gather that the course pursued by the makers is on the following lines: A mould from a print is made and the print pressed into the mould and there dried under pressure to the form of the mould. The surface of a block of wood is sensitized, and on this block a print is made, or a print may be pasted down on the block. The wood is then carved out to varying depths, according to the intensity of the high lights and shadows of the photograph. In carving, the high lights and features are cut in the deepest, and from them the remaining carving is graduated. The wood mould is smoothened so that no rough surfaces are left and is then ready to receive the print. To register the moulded impression and the print, a frame is provided which is the exact size of the print. In this the print is laid and registered exactly with the mould. The prints are mounted on a cardboard backing, are moistened and placed over the mould in

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the frame, face downwards. Sponge rubber is then spread over the back and the whole placed in a press, which, by means of the interposed rubber, forces the print into the mould, compelling it to take the shape of the mould, thus producing in the photograph the desired relief. The print is kept under pressure until dry, when it will be found to be embossed in conformity to the mould. If this latter has been carefully made, the likeness to the individual will be remarkable. After drying, the embossed print is mounted and matted.

The progressive photographer will do well to note this improvement in his art and to avail himself of the opportunity afforded him of introducing something out of the ordinary to his patrons.

AMATEUR PHOTOGRAPHY.

THE demand of the amateur photographer for thoroughly compact and portable cameras has been met by the manufacture of cycle cameras, and small cameras of various shapes have been placed upon the market. These are capable of yielding excellent results, but, of course, call for as much, or even more, care as is given to larger instruments.

The number of photographers increases daily, and the possibilities of photography increase in like proportion. The rapid growth of photography during the past year is to be attributed to the impetus it has received from the efforts of scientific amateur photographers and from its application along certain lines which have been of commercial value, in addition to being scientifically interesting. The past twelve months have seen the development of X-ray photography—or radiography, as it is now almost universally designated—and have also witnessed the bringing to practical perfection of the reproduction of motion on the lantern screen. Both of these achievements must have considerable effect on the future of amateur photography.

We have seen in our previous issue that, for the reproduction of objects in motion, it is necessary to use long strips of sensitive film and to have apparatus mechanically perfect, working with the smoothness and precision of a chronometer. Apart from the general interest in photography that must be awakened in the minds of those who witness the reproduction of moving objects at our various theaters and halls, this new method of photographing and projection must affect considerably the manufacture of rollable sensitive films, and will, without doubt, result in the further perfection of this most portable of sensitive surfaces. The only drawback that is now experienced in the making of the negatives and positives for the vitascope and cinematographe is due to the slight imperfections in the film itself. With the enormous demand that must ensue from the popularity of these instruments, there must come increased attention to the manufacture of films, and it of course follows that all films will be materially improved upon.

Again, when developing his roll of film, the amateur photographer is wont to cut it into small strips and develop these. With the employment, on a considerable scale, of long rolls of film, there will be developed methods of development that will permit of the ready development of long strips without cutting, and with a saving of time and labor. The films may be wound around a drum, and the drum slowly moved while the lowest surface passes through the developer.

Again, it is by no means improbable that the amateur photographer will before long be in a position to expose his own strips of film on moving objects, and reproduce them either in the seclusion of his home or on a screen to an admiring audience. There seems to be no reason why a long strip of enameled bromide paper should not be printed from one of these strips of film and this passed rapidly beneath a magnifying glass, either by means of clockwork or by a hand wheel.

Indeed, the possibilities along this line are many, and can only be developed by the efforts of those, interested in photography, having time and means to push their investigations.

The discovery of radiography, or the action of so-called X rays upon sensitive plates, has awakened electricians to the possibilities of electricity in connection with photography, and we may expect large accessions to the ranks of amateur photographers from many devotees to electricity. Again, there is much room for speculation in connection with electricity and photography, and much room for research, which can only be carried on by amateur photographers.

The general widespread adoption of photography by people of all occupations has tended to greatly improve the technical side of photography, and to increase its applications to an extent entirely undreamt of by the fathers of photography. It is somewhat unfortunate that the art side has, until of late years, received but little attention, though this may be accounted for very easily. It would seem, however, that a decided effort is now being made to cultivate art instincts in amateur and professional photographers, and we would strongly advise our readers to study art wherever they can, and to carefully read the books on the subject written by such authorities as Robinson and Wall.

There is little doubt but that photography is developing at an immense rate, and that before very long the much-to-be-desired climax of photographing in colors will be reached. In the meantime we would offer a word to those beginning photography. Many failures are sent in to us, accompanied by complaints and a request for information as to the cause of the trouble. The camera is an inanimate object, having no power of thinking and no power of selection. It is a tool in the hands of a more or less intelligent workman. The resulting picture is the product of the workman, not of the camera. Be the picture poor, under exposed, out of focus, faulty artistically, the workman is to be blamed, not the camera. In these days, the beginner plunges into photography without preparation, forgetting that instruction is just as necessary as in riding a bicycle. A good manual on photography should be in the hands of every one, and should be carefully read. With even a partial understanding of the possibilities of the camera, there would be fewer utter failures and a general raising of the standard of amateur photography.

STUDY BY RÖSCH.

CHEAP MATERIALS.

IN a paper read before the Photographers' Association of America, Mr. F. Dundas Todd touched on a subject to which the careful attention of photographers should be given. He said: "Low-priced labor, plates, paper and card stock are not always cheap, but too often come very dear. A paper manufacturer once told me that he would rather lose $50,000 than let a bad batch get on the market, as he might be ruined before he could get confidence in his goods re-established, and yet to-day there are hundreds, yes, thousands, of photographers who, for the sake of a few dollars, turn out goods that within a year's time might cause their total ruin. Cheap labor, as a rule, is not skilled labor, and an ignorant workman can in a day cost his employer more than a high-priced, capable man will cost him in a year. A bad plate in a box of unreliable plates will in time and labor easily offset the money saved on the goods, while the fading and discoloration in prints, due to bad emulsion on a gross of paper and a lot of chemically impure mounts, may mean total loss of business. Cheap chemicals are always dear."

Within the past few months several articles of apparent cheapness have been placed upon the market, and the prices at which these articles are sold are such as to awaken suspicion in the minds of all intelligent workers.

Papers under various names, at ridiculously low prices, have been advertised, and while it is a fact that the majority of photographers have profited by bitter experience in the past, there are, perhaps, some few who may be tempted to take chances because of the apparent saving in the cost of the paper. In considering the course to be adopted when a paper of unusual cheapness is offered, two questions should be satisfactorily answered: First, will the new material yield as good results as the old and tried product with which the photographer has gained the confidence of his patrons? Second, will the finished prints, indeed, cost less than those made on the more expensive paper?

Those photographers who were wise enough to attend the Chautauqua Convention and who availed themselves of the opportunity there afforded to see probably the largest sensitized paper factory in the world in active operation were, no doubt, considerably impressed with the high standard of intelligence of all engaged there, and with the many precautions adopted by the company to prevent, if possible, even a single sheet of the paper leaving the establishment unless it was of the highest possible quality. All will remember the long line of young women, seated by windows, actually examining every sheet of paper before it was sent to the packers. The cleanliness, freedom from all deleterious matter and position of the factory amid trees and other dust preventers, and, indeed, the thousand and one precautions adopted to insure a perfect product, must have been noticed. Further, it is a well-known fact that different samples of what is apparently the same material vary considerably in composition, and experienced chemists must be in charge to guarantee reliability of output. All these precautions, of course, add to the cost of the paper, and the expense should be cheerfully borne by the photographer, for it is, indeed, a small outlay when one considers the element of security thus assured him. Small manufacturers of cheap papers cannot guarantee to the photographer that which it is necessary he should be guaranteed against, and we would, therefore, strongly warn photographers, professionals especially, against the use of so-called cheap papers, on the ground that it is impossible for the manufacturers to surround the manufacture of their paper with such safeguards as to entirely eliminate the source of danger. The old question as to the relative value and permanency of gelatine and collodion, it is, perhaps, hardly worth while to allude to. It seems pretty well established in this country that the day of the gelatino-chloride paper has gone. Some few small manufacturers continue to supply it to beginners, who, after a little experience, drop it in favor of collodion papers. This statement, it is probable, will be attributed to a desire on our part to push the products of a certain company, but we feel that we are justified in making it, for it is borne out by the facts. Collodio-chloride papers are, undoubtedly, permanent to an extent sufficient to satisfy the most exacting. Gelatine papers on the other hand are uncertain quantities, and the wise photographer leaves them severely alone. As regards our second point, as to whether these so-called cheap papers are in reality less expensive than the higher priced papers, we would point out that it will be found in most cases that there are other items of expense that far more than counterbalance the difference in cost. Hardening solution in profusion has to be used, and the quantity of gold necessary for toning is more than doubled, so that from both points of view real economy lies in the direction of the higher priced paper.

As regards plates, the best plates are none too good for the photographer. The day will, perhaps, come, when every professional photographer and amateur photographer will use nothing but a backed orthochromatic plate When photographers pay more attention to the literature of their subject and profit by the work of ardent experimenters they will produce better results. In the meantime we desire to go on record as advocating backed orthochromatic plates for practically every purpose.

In the line of chemicals the photographer is again liable to be tempted with cheap and adulterated substances masquerading under the names of pyro, sulphite of soda, potassium chloro-platinite, etc. In the case of pyro, perhaps, warning is unnecessary, for there are only two brands that receive any attention at the hands of photographers; but the demand for potassium chloro-platinite for the toning of matt-surface papers has of late been so great that the market has been flooded with a cheap variety to which many of the failures reported to us are distinctly traceable.

This salt of platinum is by no means an easy one to prepare, and is liable to vary greatly in composition. An absolutely reliable brand, preferably one recommended by the maker of the paper, should in all cases be employed Better by far pay 5 cents more for the platinite than lose a gross or two of prints through false economy.

This same line of argument may be, of course, followed in connection with everything used by the photographer. It is not to be expected that dollars can be bought for 50 cents, and it is not to be expected that absolutely reliable articles can be produced at a price less than the cost of the raw materials. The motto for the photographer to adopt is: "Buy as cheaply as you can and see that every article is bought from a reliable house, and, in cases where your own reputation will be at stake in the use of materials, use only such as have a reputation of their own."

"THE INTERNATIONAL ANNUAL" FOR 1897.

THIS popular American "Annual" has reached the ninth volume, and the latter promises to be by far the best of the series. Photography during the past few years has made rapid strides, and this advance must, in a large measure, be attributed to the spread of photographic literature and the consequent dissemination of knowledge and ideas. In this work the "Annual" has played no small part, carrying to every quarter of the globe the best thoughts of the best workers. In the volume soon to be issued will be found much well worthy of the careful attention of all the friends of photography. The best known authorities in the world are among the contributors, and the illustrations, we venture to think, will truly represent the state of photography and photo-reproduction at the present date. The photo-engravers of America will be fully represented with the best specimens of their work, and the "Annual" will go on record as indicative of the present status of photo-reproduction in this country. It has been said that photo-reproduction is at its best in the United States, and the "Annual" will demonstrate what can be done here. To supply subjects for the photo-engravers, the best amateur and professional photographers in the country have loaned their pictures. An unusually complete list of useful formulas will be found in this year-book, and a complete list of home and foreign societies, brought up to date, forms a useful adjunct. As a subtitle, the words "and American Process Year-Book" have been added, and those interested in the production of the illustrations can learn much regarding the manipulation necessary to produce them.

Among the contributors we would note:

Walter Sprange, M. B. Punnett, E. K. Hough, A. Bogardus, Adelaide Skeel, Manly Miles, W. J. Hickmott, R. A. R. Bennett, J. Gaedicke, Victor Schumann, E. Valenta, J. Joé, F. Paul Liesegang, Dr. R. Neuhauss, T. Perkins, Prof. W. M. Stine, Chapman Jones, Dr. Hugo Erichsen, Romyn Hitchcock, R. E. M. Bain, Col. J. Waterhouse, Oscar E. Binner, O. Jarecki, Matthew Surface, A. D. Guthrie, H. Crisp, William Gamble, G. Kilburn, C. E. Fairman, S. E. Kelf, H. M. C. Sprunt, Y. Isawa, H. Holcroft, C. H. Cox, V. Legros, H. T. Duffield, J. Boothroyd and John W. Sanborn.

Items of Interest

The Photographic Convention of the United Kingdom will be held in 1897 at Great Yarmouth, under the presidency of F. P. Cembrano.

◆

The public interest in the vitascope and cinematographe exhibitions, alluded to in our August issue, shows no signs of abatement. A recent visit to the New York theaters where these instruments are in operation reveals the fact that the exhibition of motion on the screen is the most appreciated part of the whole performance. The theaters are packed at the time announced for the exhibition, and it looks as if the interest would be maintained throughout the whole of the coming theatrical season. The great advantage, of course, lies in the possibility of varying the programme from week to week and illustrating events that are occupying public attention.

◆

The troubles arising from vibration in the camera have been overcome, and all that now remains is for more careful attention to be given to the development of the positive films. A little filling up of transparent spots would be beneficial. But this successful portrayal of motion on the lantern screen is an immense advance, calculated to stimulate inventive genius and to have no little effect on the future of photography.

◆

The vitascope creates a demand for a perfect rollable film and a demand that will have to be met with an article beyond reproach. The amateur photographer, who made the vitascope possible, will thus benefit by it.

◆

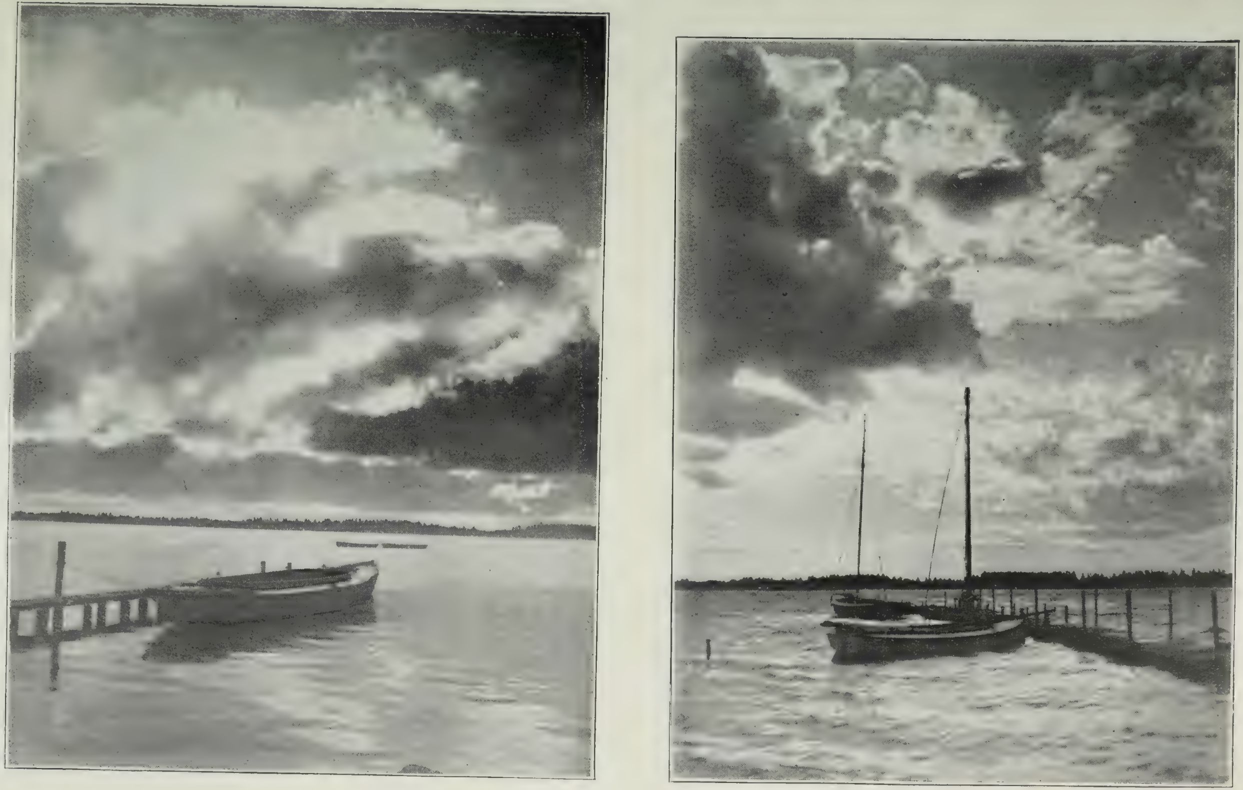
In the future, instead of a photograph with a frozen and fixed expression, such as are the vogue to-day, a band of pictures some 150 feet long, on an extremely thin flexible film, will be presented to us by the photographer. This will be placed in our table kinetoscope and a picture showing some life and expression will be at our command.

◆

A stereoscopic table instrument for viewing objects in motion would be a success.

◆

At the annual meeting of the Victoria Institute in London, Sir George Stokes declared his belief that the X rays were light or trans-



CLOUD STUDIES BY H CRISP.

verse vibrations in the luminiferous ether. Lord Kelvin pointed out that if this were so, as they are a hundred times more frequent than green light, X rays would produce seventy thousand million million vibrations per second. This is rapid with a vengeance, and the only wonder is that X rays stop at anything.

* * *

To save the trouble and sometime loss of making fluoroscope screens by the usual method of coating with collodion and sifting on of calcium tungstate, it is suggested that a piece of thin cardboard, in which an opening of the desired size has been cut, be glued to a sheet of aluminium. Over this is fastened a second piece of cardboard, the space between this second piece and the aluminium being filled with a uniform layer of calcium tungstate.

* * *

"The first object of a color screen is to cut out the invisible ultra-violet and the dark violet rays, and at the same time the action in the blue should be greatly reduced. There are plenty of dye-stuffs which cut out the blue and the violet-blue, but which do not entirely cut out the dark violet and the ultra-violet rays; multiple yellow is one of these, and aurine and chrysoidine are others. I do not know of any simpler or more effective test of the power of a dye-stuff to cut out the ultra-violet light than to simply expose a plate through the color screen and a piece of ordinary pot yellow glass, and a piece of cobalt blue, using an ordinary plate. If your screen, with the ordinary plate, makes the cobalt-blue photograph as dark or darker than the yellow, you may be sure that the dark violet is cut out by the screen; but an unsuitable color, like the multiple yellow, will make the cobalt-blue photograph very light, and the yellow almost black by comparison."—F. E. Ives.

* * *

In his address at the Photographic Convention of the United Kingdom, Mr. H. P. Robinson, the president, touched on professional photography and spoke of the necessity for originality and individuality. He thought that some such revolution in the portrait profession as had taken place in the opinions and practice of those whose chief aim is pictorial photography was greatly to be desired. The way to that desirable goal was through harder study of art, on entirely different lines from what is usual, and the greater confidence which knowledge brings. Portraits—counterfeit presentments—are all manufactured to the same conventional pattern, with very little variation. Is it to be wondered that the public are getting tired?

* * *

H. P. Robinson's new book, "Elements of a Pictorial Photograph," contains many trite remarks that deserve more than a passing thought. Here are a few of them:

"Nature never cares whether she has a sky or a foreground; the photographer should take care that the bit of her he selects has both, and it is in these departments he has most control. An artist ought to be able to teach Nature a lot about the use of the sky in a picture. Photographers sometimes let her have her own way; and she sometimes, it must be admitted, flukes a success, but it is not safe to rely upon her.

"It must be admitted that a picture which tells you something worth the telling has more interest than one which has nothing to say except the professional fact that the artist can paint or photograph with skill, and it follows that a landscape with a figure or figures, where figures are appropriate, is better than one without such embellishment; and if those figures are 'doing something,' or embody some incident, they are still more interesting.

"Photography would have been a settled fine art long ago if we had not, in more ways than one, gone so much into detail. We have always been too proud of the detail of our work, and the ordinary details of our processes.

"To look at a perfectly defined photograph is like reading a novel of which you know the plot, nay, it is even less interesting, for you have the satisfaction, when you know the plot of a story, of judging how the author has written his book; while it does not give you a moment's pleasure to judge how the photographer has done his work.

"Impressionism, then, does not mean hasty impression nor misty impression. It means *unity and order of impression gained by focusing the subject.* Just as linear perspective introduced a unifying natural action of the eye into painting, with one angle of view in place of a dozen, so does impressionism follow the natural eye, with one focus for a dozen.

"Taste has improved the world by limiting different materials to their own natural appearances—wall-paper, for instance, no longer pretends to be wood or marble—without limiting art, and I don't know that it is necessary for photography to look like the results of any other art. On the other hand, it need not insist on the brand of its calling; there need be no insistence on its looking aggressively photographic. Each art should respect its own individuality, but not worship it as a fetich."

* * *

HERR HUGO HINTERBERGER has recently been appointed Lecturer on Photography at the Vienna University. How long will it be before similar instruction is given in our universities?

* * *

IT is said that a San Francisco photographer has perfected a device whereby every railroad ticket bears a photograph of the original purchaser. While the general application of this method of identification

O. P. HAVENS. ON THE TOMOKA.

seems to us unnecessary, it would certainly be useful in case of passes and commuters, where rebate is made by the road to regular patrons.

* * *

MATT surface prints may be made glossy by immersing them in a solution of gelatine for about one minute, draining and drying. To get a high finish the dampened print is squeegeed face down on a ferrotype plate, or a sheet of talced glass.

* * *

LIESEGANG suggests that, as very few micro-organisms will grow in an atmosphere containing a small quantity of ammonia, photographers keep the paste pot under a glass shade, side by side with a vessel containing a little liquid ammonia. This shade serves also to keep the paste from surface drying.

* * *

WE have often spoken of the desirability of a reliable school of photography, and take pleasure in calling the attention of our readers to one located in the Central Music Hall, Chicago, and known as Jarmuth's School of Photography. Mr. Jarmuth is an able chemist and photographer, and has studied his art both here in Europe. He possesses two of the leading galleries in Chicago, and at the College of Photography has every appliance for the proper and complete instruction of his pupils. Those already in business, as well as beginners, will do well to keep in touch with this college, to help it and to be helped by it. We wish it every success, and will take pleasure in reproducing work made by its students, and in recommending it to all desiring instruction.

* * *

WE are always glad to receive from our readers prints having general interest and will carefully reproduce all that answer this requirement.

* * *

All matter relating to the October issue must be in our hands on or before September 20th.

[illegible] ON THE SANDS.

EXPANSION AND STRETCHING OF PAPER AS A CAUSE OF DISTORTION.

TROUBLE often arises from the stretching of the paper to such an extent as to cause distortion in photographs. Although this subject has frequently been dealt with in the journals there seems still to be some misconception on the matter, as evidenced in two instances that have quite recently come under my notice. These were not with novices, but with photographers of several years' experience. It is often noticed that two prints from the same negative are not identical when they are mounted and finished. The features of the one—supposing it to be a portrait—may be longer or broader than they are in the other.

Most people are aware that photographic papers, like all other papers, expand when wetted, but all do not seem to know that the expansion is greater in one direction of the sheet than it is in the other. The papers used in photography are machine-made papers, and the expansion of these is always greater in the transverse way of the web than it is in the longitudinal direction. Therefore, if two prints be made from the same negative, on paper which, in the one case, is cut lengthwise of the web, and in the other crosswise, there will be a palpable difference between them while they are wet and when they are dry, if they are mounted just as they are taken from the washing water and when the paper is in the state of greatest expansion.

Experiments, detailed in *The British Journal of Photography* a few years ago, showed that the normal expansion of Rives paper was, in the direction of the web, but $\frac{1}{8}$ inch in 24 inches; while that across it expanded more than $\frac{1}{2}$ inch. Now, taking the greatest expansion, it will be seen that after all it does not amount to much, only about 1 in 48. That being the case, it is very unlikely that any marked difference would be noticed in, say, the features of a couple of cabinet portraits if they were made on paper cut the two directions from the sheet, though it is manifest that they are different, There is often, however, a much greater difference in some prints than can well be accounted for by the normal expansion of the paper, and the object of this article is to point out the cause.

Paper, when thoroughly soaked with water, can be stretched very considerably, and it is to stretching in the mounting that considerable distortion and dissimilarity—when it exists—in prints is generally due. Quoting from the experiments just referred to, we find that 24-inch strips cut longitudinally of the web, when mounted wet on stout cardboard (with stretching), measured 24$\frac{1}{2}$ inches when dry. Those cut the reverse way, and similarly dealt with, measured 25$\frac{3}{4}$ inches, or an extension of an inch and $\frac{3}{4}$. That was with plain Rives paper, but on the experiments being repeated with albumenized paper the distension was still greater, namely, 2 inches in the 24, or just $\frac{1}{12}$. Now it will be seen that there would be a palpable difference, supposing two prints were made from the same negatives, the one on paper cut along the web and mounted without stretching, and the other cut across it and stretched to its maximum in the mounting. The one would be $\frac{1}{12}$ longer than the other, equivalent to $\frac{1}{4}$ inch in a 3-inch head.

It is not at all an uncommon thing with some mounters, when a print is not evenly placed on the mount in the first instance, to gently strain it into position instead of taking it quite off the mount again. It will be seen that, in this way, the perpendiculars of a building may be rendered anything but straight, and, also, that the features in a portrait can be much distorted, particularly by diagonal stretching.

What takes place with ordinary papers also takes place with "parchment paper," and in greater degree even. It is this kind of paper which is used in a collotype process that has been demonstrated frequently before photographic societies during the last three or four years. As, in this method, the paper has to be strained very tightly to keep it flat in the apparatus for inking, it will be seen that collotypes made by this system may show a considerable degree of distortion, and also not be true to scale, unless allowance be made for the stretching in taking the negative.

The expansion of paper may, however, sometimes be turned to profitable account. It may be made the means of producing a more flattering portrait, say, for example, a round face may be lengthened by cutting the paper crosswise of the web, and gently stretching the print in the mounting ; or a long and thin face may be similarly broadened. In copying designs to scale it may sometimes be turned to account in the event of the negative not being strictly to the dimensions ordered, a trifle smaller for example. If the print be mounted wet it will be, more or less, larger than the negative, according to the way of the paper. If, on the other hand, it be mounted dry, and with a mountant that contains a large proportion of spirit, in place of water, it will be practically the same size as the negative, supposing the paper to be cut lengthwise. E. W. FOXLEE.

FIXING AND WASHING OF PAPER PRINTS.*

THE permanency of a print depends on the thorough removal of salts of silver from the high lights and the subsequent elimination of the fixing agent. The removal of the fixing agent can be easily and most rapidly effected by means of plain water, but the complete removal of the insoluble salts of silver, in the case of albumenized paper, is a task which up to the present has not been accomplished. Hyposulphite of soda will dissolve with ease the insoluble inorganic salts of silver from the paper, but the organic salt, most probably albumenate of silver, is not so easy to dissolve, and, if silver prints are to be made more permanent than they are at present, we must devote our attention to the solution of this difficult problem. The complete removal of the organic salt is not an impossibility, but we must consider the effect of the reagent on the material of which the picture itself is formed.

On August 3, 1893, Mr. Grundy and myself read a paper before the London and Provincial Photographic Association, in which we gave in detail our endeavors to arrive at the cause of the fading of prints on albumenized paper, and also the time necessary for the complete removal of the hyposulphite of soda from such paper by washing in running water.

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* Read before the Photographic Convention of the United Kingdom, July 14, 1896.

The method we adopted was briefly this : Albumenized paper was sensitized on a 50-grain nitrate of silver bath, neutral, for three minutes ; the paper was then allowed to dry in the dark. When dry it was cut up into pieces measuring 5½ x 8½, *i. e.*, each piece was one-eighth of a sheet. Three sheets were necessary, and each piece from the same sheet was marked so as to distinguish the pieces from the different sheets.

The paper was then washed and fixed just as would have been done had these pieces of paper been prints instead of unprinted paper. The strength of the hypo solution was 20 per cent., and the time of fixation, as usual, fifteen minutes.

In all cases a quarter of a sheet was dealt with in order to obtain a sufficient quantity of material to work upon, and, in order to obtain a mean result, the two pieces were selected from different sheets.

After the washing was completed, two pieces were set aside to determine the quantity of silver to be removed and the amount of sulphur in the paper after fixation, also two pieces were selected to estimate the silver, soluble and insoluble, and the total sulphur. The remainder of the fixed paper was then transferred to a large vessel filled with water, and into which water was running from a piece of india-rubber tubing connected to the water supply. The temperature of the water was 13 degrees Cent. During the first hour the pieces of paper were constantly turned over by hand in order to prevent them sticking together.

Two pieces were removed at the end of 5, 10, 15, 25, 40, 60, 90, 120 minutes, and 19 hours, and the amounts of sulphur and silver determined.

The estimation of the sulphur and silver was carried out as follows—

In each case the two pieces of paper were allowed to drain for five minutes, and then torn up into small pieces and placed in a large beaker with a mixture of 100 cubic centimeters of nitric acid, and 200 cubic centimeters of hydrochloric acid (free from sulphur), covered with a clock glass, and heated on a sand bath till the paper was completely destroyed. The solution was then taken down to dryness, and 250 cubic centimeters of pure distilled water and three drops of hydrochloric acid added, and the whole heated to boiling, allowed to cool, and filtered, and the filter paper broken and washed with boiling distilled water. The filtrate was heated to boiling point, and chloride of barium added, which precipitated all the sulphates present as barium sulphate. This was collected on a filter, washed, dried, and weighed in the usual way, and from the weight of sulphate of barium the amount of sulphur present calculated.

The chloride of silver on the original filter paper was dissolved out by means of ammonia, and precipitated with nitric acid, filtered off, and treated as in the usual manner.

The figures obtained were as follows :—

	Weight of Sulphur. Grams.	Weight of Silver. Grams.
In original paper	.0050	.0734
" water adhering to paper	.000032	——
" paper fixed but not washed	.2243	.0086
" " after 5 minutes' washing	.0063	.0051
" " " 10 " "	.0045	.0035
" " " 15 " "	.0048	.0037
" " " 25 " "	.0044	.0037
" " " 40 " "	.0043	.0033
" " " 60 " "	.0046	.0036
" " " 90 " "	.0047	.0038
" " " 120 " "	.0045	.0040
" " " 19 hours' "	.0047	.0039

From these figures it will be seen that, after ten minutes' washing in rapidly changing water, as much hypo and silver are eliminated as can be removed in nineteen hours. After ten minutes' washing, the quantities of sulphur and silver become constant.

From the figures given above, it can be easily calculated that about a quarter grain of metallic silver remains in a whole sheet of albumenized paper, and this after the paper has been as thoroughly fixed as is possible using hypo, and after washing so as to remove all that water can dissolve out.

This quantity of silver spread over an area of 17 x 22 inches might at first sight seem to be so small as to have no coloring power when converted into chloride and acted on by light.

Paper fixed and washed as described when brought into contact with sulphuretted hydrogen turns brown. When the gas is used it requires time, but when a solution of the gas is employed, the action is much more prompt.

The existence of silver in albumenized paper which has not been exposed to light, but has been fixed and washed, can be easily shown by first converting the silver, in whatever form it may exist in the paper, into chloride (by soaking it in chlorine water and washing) and then resensitizing by brushing over the surface a weak solution of nitrate of potash. Such paper, when exposed under a negative, gives a fairly strong print—much stronger, indeed, than would be ascribed to the small quantity of silver present.

In the case of gelatino-chloride of silver paper it is possible to remove the whole of the silver when the paper is fixed in a fairly strong solution of hypo, and the amount of washing, with running water and proper care, was not found to exceed that required in the case of albumenized paper.

It ought not to be astonishing that the whole of the silver from the high lights of pictures on such paper can be removed, as most probably the gelatine is never, during the preparation of the emulsion, in presence of an excess of nitrate of silver, and from this cause, no organic salt of silver is formed, as in the case of albumenized paper. Gelatine, however, is a very treacherous compound to deal with, and, if any change in color take place in a print on such paper, it must be due to imperfect fixation, bad washing, a combination of the two, or to the gelatine itself undergoing change.

Long soaking in the case of gelatine papers is a disadvantage, as the water dissolves out the alum used by the manufacturer to harden the gelatine, and, if under these circumstances the prints are squeegeed to glass or ferrotype plates, they invariably stick, and cannot by any means be removed perfect.

Many photographers are under the impression that, in consequence of the greater thickness of the layer of gelatine as compared with albumen, it requires a longer soaking to remove the salt ; but this is a mistake, as gelatine allows the solution of the salts to diffuse through it with equal or even greater facility than in the case of albumen.

The results I have given you thus far are those obtained when the paper has been washed in running water ; but this mode of washing cannot be universally employed, as in some cases water may be scarce, and in others it may not be convenient to leave the prints to the tender mercies of the servants in the kitchen, or even in the bathroom, and then it becomes necessary to remove the hypo by soaking the prints in water contained in shallow dishes. When this method of washing is adopted, three questions have to be answered before we can say that all the soluble salts have been removed from the prints.

1. What must be the ratio of the volume of water to the area of paper to be washed?
2. How long must the prints be allowed to soak in each quantity of water ?
3. How many changes of water must the prints be subjected to ?

These questions we have endeavored to answer in a paper contributed to the *Photographic Review*, June, 1896, and also read before the London and Provincial Photographic Association.

We selected albumenized paper in preference to gelatino-chloride, as the latter is usually so loaded with sulphate of barium that it is exceedingly difficult to obtain clear solutions by filtration through paper, especially when treating the ash of the burnt paper with ammonia ; and, from what we now know, it is perfectly clear that what is true of the one kind of paper is equally true for the other as regards time of washing.

We did not attempt to determine the amount of sulphur left in the paper, as it will be remembered that, in the case of albumenized paper, washed in running water, the sulphur and silver disappeared at the same rate, and that, when the quantity of silver became constant, then also did the sulphur, so that the determination of the silver, left at given intervals of washing, was a difficult guide to say how many changes of water, under given conditions, the paper should receive.

The albumenized paper was marked, sensitized, washed and fixed as already described.

The first thing to be decided before proceeding to the washing of the paper was the ratio of the volume of water to area of paper. For convenience of measurement, we settled on 1 cubic centimeter per square centimeter of paper, *i. e.*, roughly about 1 fluid ounce of water to every 4½ square inches of surface to be washed.

After the prints had been fixed the requisite time, they were plunged and separated from each other as rapidly as possible into the measured quantity of water. After soaking for five minutes with constant movement, two pieces were taken out and dried, the remainder being transferred to another dish with the quantity of water diminished in proportion to the area of paper removed.

This operation was carried on till the last pieces received ten soakings of five minutes each in ten different changes of water.

A portion of each washing water was set aside for testing with permanganate of potash, iodide of starch and sulphuretted hydrogen, dissolved in water.

It was found, by a preliminary experiment, that one drop of each of the solutions of permanganate and iodide of starch produced a distinct coloration in a test tube, filled with water, 6 inches long, when looked through lengthwise at a sheet of white paper. In order to ascertain when the hypo in the washing water had exactly done its work, such a number of drops of the reagents were added to the water, in similar test tubes, so as to just match the tints in the test tubes filled with plain water and 1 drop of reagent.

The number of drops required in each case, and the amount of silver left after each washing, will be given in a table presently.

The papers being dry, they were placed in a porcelain dish, and heated till ash free from carbon was left. The ash was then washed several times with boiling distilled water, and then boiled with dilute nitric acid, in order to dissolve out the metallic silver. The contents of the beaker were then filtered and washed, and the ash on the filter paper subjected to the action of strong ammonia, in order to dissolve any silver chloride that might have been formed due to impurities in the nitric acid. This, when filtered, was treated with nitric acid, and added to the previous filtrate; the whole was then heated to the boiling point, and a few drops of hydrochloric acid added to precipitate the silver as chloride. The precipitate was then collected and weighed, and the silver estimated in the ordinary way.

The following table gives the results obtained:

Change of Water.	Silver in Quarter Plate.	Number of Drops of—		Sulphuretted Hydrogen.
		Permanganate.	Iodide of Starch.	
1	.0055	more than 10	more than 10	Brown color.
2	.0045	" " 10	" " 10	Faint tinge.
3	.0040	2	3	No color.
4	.0040	1	1	"
5	.0044	1	1	"
6	.0042	1	1	"
7	.0044	1	1	"
8	.0040	1	1	"
9	.0043	1	1	"
10	.0040	1	1	"

These results show that, at the end of the third washing, the amount of silver becomes constant, and that farther washing has no effect as regards reducing the quantity of silver left in the paper.

The hypo indicators also point to the same result, that, after the third change of water, no hypo is present to discharge the color of the permanganate or decompose the iodide of starch.

Three soakings in different water seems at first sight insufficient washing to remove the salts, but at the same time we must remember that all that the water has to do is to displace a given volume of the solution of hypo contained in a medium through which diffusion can take place very readily. The silver is already in solution, and it is merely a matter of rate of diffusion. Naturally it takes longer for the last traces to be removed than it does for the bulk of the salts to pass out.

Five minutes ought to be amply sufficient for the salts to diffuse out into the surrounding water; and, if this be so, it becomes a very simple calculation to find how many changes of water the prints must be subjected to in order to reduce the quantity of hypo in a given area of paper to something so very small that it is incapable of producing any deleterious effect on the print.

Hypo eliminators have been recommended at different times, and praised by some and abused by others. If the same amount of trouble be taken, using plain water instead of these salts, I am sure equally good, if not better, results will follow. Any hypo oxidizer is dangerous, in that it is likely, by destroying the solvents, to throw down some silver compound when it would not have been deposited if water only had been used. Fortunately, however, we are generally recommended to give the prints three or four washings before applying the compound, and this is the safeguard, for, if it had been applied at an early stage of the washing, its effect for evil would be very much more marked than has been the case.

The removal of hypo and the silver compounds formed is an easy matter, if done with care. I do not mean to say that the mere soaking of paper at the bottom of a dish for fifteen or twenty minutes will remove these salts; the prints must be constantly turned over so as to bring fresh water into contact with them. Two or three hours' washing, as still recommended by several paper-makers, is a mistake, especially if the prints are left to take care of themselves. In the case of gelatino-chloride papers, even proper washing for that length of time is detrimental to the quality of the gelatine; it tends to remove the alum the maker has purposely added in order to harden it, and if it be removed by long soaking, on attempting to glaze such prints by attaching them to any support, they invariably stick. Give a short washing, and the result is different.

I am certain, if photographers will persist in their old-fashioned way of washing prints for six or eight hours, that it would amply repay the water companies, where much printing is done, to supply labor free, to constantly change the prints in the water, and give short washings, thus insuring better results and a less waste of that most valuable natural product H_2O. A. Haddon.

O. F. Haynes. THE RAMBLE, FORT WORTH, FLA.

O. P. Havens. COCOANUTS.

WATCH DIAL PHOTOGRAPHS.

PHOTOGRAPHS may be produced on watch dials by either of two methods, writes E. J. Wall in *The Photographic News:* "First, by the ceramic enamel process, which requires considerable experience, and, also, a muffle furnace wherein to fire them; the second process is by the use of collodio-chloride emulsion. This again may be subdivided into the development and printing-out processes. For the development process Teape's formula will be found the most satisfactory. The dials must be well cleaned with soap and water, washed in plain water, then in distilled water, and put away in a warm place free from dust to dry, or, instead of drying them, they may be flowed over twice with a solution of albumen made by beating up the white of one egg with half an ounce of ammonia till it is all froth, and then adding 10 ounces of distilled water, allowing to stand for one day and filtering. The first time this is flowed over, the dial should be drained and then flowed over a second time and set aside to dry. When dry, they should be coated with collodion, prepared as follows: Dissolve 10 grains of zinc chloride in 300 minims of alcohol, add to this 8 grains of pyroxylin and then 390 minims of ether, and shake well till dissolved. Dissolve 23 grains of silver nitrate in 10 minims of distilled water by the aid of heat, and 90 minims of alcohol added gradually, heating if necessary to keep the silver in solution. Now in the darkroom add the silver solution to the collodion in small quantities, shaking all the time. Allow to stand for twenty-four hours, then shake and filter through cotton wool moistened with alcohol. Coat the dial thinly with this collodion, and, when set, place in a dish of distilled water and rock till all the greasy appearance disappears, then change the water twice and place the dial on a piece of blotting paper, film up, and allow to dry in a warm place free from dust. The dial thus prepared can be printed in contact with a negative in a printing frame, either by exposure to gas, or, preferably, to a piece of magnesium ribbon, and then developed with the citro-oxalate developer, or hydroquinone 4 grains, potassium bromide 25 grains, sodium sulphite 48 grains, water 1 ounce, mixed with about 10 grains of sodium carbonate, then fixed in a 10 per cent. solution of hypo, well washed and dried. For further protection the image may be varnished with crystal varnish. The pictures may be tinted with solutions of aniline colors. For the printing-out process the following may be used: Dissolve 110 grains of celloidin or pyroxylin in 3½ ounces of ether and 3½ ounces of alcohol, and add to it 5½ grains of strontium chloride and 3 grains of lithium chloride dissolved by the aid of heat in 34 minims of absolute alcohol and 34 minims of glycerine. Then add 15 grains of citric acid, dissolved by the aid of heat in as little alcohol as possible. Filter the solution and add gradually, with constant shaking, by gaslight, 50 grains of silver nitrate dissolved in 1 dram of distilled water; allow to stand twenty-four hours, shaking occasionally, filter through cotton wool, and coat the dial, which should have been previously treated with albumen as described above, and allow to dry. It can now be printed out under a negative like any paper, and toned and fixed in the same way. Great care must, of course, be taken not to allow the dial to shift during exposure. If vignetted images are required, these may be vignetted while printing, or the marginal images removed after printing by painting with a solution of potassium cyanide. These two processes are applicable for the decoration of any small articles, such as plaques, vases, cups, saucers, boxes, either wood or metal, but in the case of wood it is necessary to give it a protective coating of size followed by varnish, and it must not be forgotten that these collodion images are very liable to rub up if roughly handled, and therefore must be well varnished."

PHOTOGRAPHIC PHYSICS.

AN extended investigation of the properties of gelatine gave me an opportunity for the examination of certain actions which are of interest to photographers and to the friends of photography.

Sensitizing.

If a glass plate is coated with an aqueous solution of gelatine to which a little sodium chloride (common salt) has been added, and if, after setting, this is immersed in a solution of nitrate of silver, chloride of silver will be formed. But a difference is noted in the action if a weak and a strong solution of the nitrate of silver are employed. The stronger the bath, the clearer the plate will remain, although the reverse might be expected to be the case.

The explanation seems to be as follows : At the first contact of the chloride of sodium with the nitrate of silver an extremely thin film of chloride of silver will form at the surface of the plate. This "precipitate membrane" is penetrated only by either the chloride of sodium or the nitrate of silver. If the silver solution is stronger* than the chloride of sodium solution, the former will penetrate through the membrane into the gelatine film and produce in the whole thickness chloride of silver. In the reversed case the stronger chloride of sodium solution will penetrate through the membrane, and this has therefore to thicken towards the outside. The chloride of silver is then only on the surface and can easily be wiped off. The gelatine underneath is quite clear.

The chloride of silver forming within the gelatine has a very fine grain. If it forms outside of the gelatine, it has a coarser grain and the plate will become cloudy.

The silvering of papers, which were coated with a thick film of salted gelatine, has proved so far not successful for practical purposes, because the above conditions were not taken into consideration. A good film can, therefore, only be obtained, if a sufficiently concentrated silver bath is employed. But whether this method is of any significance, in comparison with the emulsion process, is another question which is not to be answered here.

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*For further explanation I refer to the article in *Naturwissenschaftliches Journal*, 1896, No. 30, pp. 353–362.

INTENSIFYING.

After a bleaching in bromide of copper, negatives can be considerably intensified with nitrate of silver. But the negative must not be washed too long after bleaching, because the blackening might not proceed. For fear that this might take place, the negative is sometimes not sufficiently washed. Bromide of copper will then remain in the film, which, with the nitrate of silver, forms bromide of silver. By applying a weak silver bath, for the same reason as above, a thin bromide of silver skin will form on the plate, which prevents the penetration of the silver salt. Thereby the blackening is but feeble, even if a new silver bath is repeatedly applied. Only by using a concentrated bath will it come up to the desired strength. If the latter is put to immediate action, which is of advantage, bromide of silver will form within the film, which, of course, has to be removed later on by a fixing bath.

Similar effects by insufficient washing can take place with the bichloride of mercury and ammonia method. Still, I prefer to dilute the ammonia a little. The amide can be removed from the surface by slight rubbing with the finger. If a white cloudiness has once formed within the film, it cannot be removed any more.

TONING.

During toning, a chloride of silver film can form, which gives cause to an irregular gilding, if the pictures were not previously liberated sufficiently from the nitrate of silver by washing. The longer the gold bath has been in use, the easier this will take place.

With gold baths containing ammonium sulphocyanide it is of more advantage to wash the pictures previously, as a film of silver sulphocyanide may form, which has a spotty gilding as a consequence. An addition of chloride of gold solution will not always help here, and an addition of the sulphocyanide salt is oftentimes much more necessary.

If the gold deposit will not form with a combined bath consisting of thiosinamin and chloride of gold, it has its cause generally from the fact that the mixture contained an insufficient quantity of the former body. This causes the formation of a sticky double compound of the nitrate of silver with the thiosinamin on the surface, resembling silver sulphocyanide. If this defect takes place, thiosinamin must be added, or, what is cheaper, the prints are liberated previously from the nitrate of silver by washing.

R. ED. LIESEGANG.
Translated by
HENRY DIETRICH.

THE Photographers' Association of Michigan will hold their convention in Detroit in February next. Those interested should write for full particulars to the Secretary, J. E. Watson, 148 Woodward avenue, Detroit.

PROCESS WORK

By Stephen H. Horgan.

POLITICS FOR PROCESS WORKERS.

WHILE politics is just now the chief topic under consideration, it might be timely to begin the agitation of a subject political that is of vital interest to process workers, but which has not been brought to their attention, and that is, the injustice done the whole engraving business by the present copyright law. It is a grievance that can only be remedied through politics, and now is the time for engravers to acquaint themselves with the wrong being done their business and set to work to right it. They can have the matter adjusted by the next Congress, providing they begin at once, either through their organizations or individually, to correspond with their congressmen and demand that engravers receive the same recognition from the Government that is accorded lithographers and machine typesetters.

When the present copyright law was being formulated, an association of publishers, both American and foreign, sent agents to Washington to see that the law was fixed to suit them. The typographical and lithographers' unions had representatives there. The engravers, not being organized at that time, were ignored, and the result was their business received a blow that it will never recover from until an omission in that law is rectified. What that carefully planned omission is can be understood by a careful reading of the following extracts from the existing copyright law. First is defined the person and subjects entitled to the protection of copyright:

"Sec. 4952. The author, inventor, designer or proprietor of any book, map, chart, dramatic or musical composition, engraving, cut, print, or photograph or negative thereof, or of a painting, drawing, chromo, statue, statuary, and of models or designs intended to be perfected as works of the fine arts"—

Now comes the discrimination. Note carefully the deliberate omission of the words "engraving, cut and print" from the proviso in the same law which reads:

"Provided, that in the case of a book, photograph, chromo, or lithograph, the same shall be printed from type set within the limits of the United States, or from plates made therefrom, or from negatives or drawings on stone made within the limits of the United States, or from transfers made therefrom. During the existence of such copyright the importation of any book, chromo, or lithograph, or photograph, so copyrighted, or any edition or editions thereof, or any plate of the same not made from type set, negatives, or drawings on stone made within the limits of the United States, shall be, and is hereby prohibited."

No sooner was this law approved than the publishers rushed to Europe their orders for steel engravings, copper plate engravings, photogravures, photo-engravings and engravings of all kinds to illustrate their books and periodicals. Business with foreign engraving houses became brisk. In some lines, however, notably photo-engraving, their work could not compare with ours in quality, so photo-engravers were engaged from here to introduce American methods in foreign cities. The majority of the more skillful of our American engravers were shortly after compelled to give up the business by which they had brought credit to this country. Wood engraving, for instance, which had reached with us a higher degree of perfection than it was heretofore considered capable of, then received its death blow and will soon be known as a lost art.

The magnitude of the engraving business now done abroad for American houses cannot be estimated, but take *Harper's Bazar* as a single example of this loss. Every engraving of any importance in this publication is not only designed abroad, but it is also engraved abroad, and every portion of this work is protected by United States copyright, because its illustrations are engravings. Were they lithographs, they would have to be made in this country to be entitled to the privilege of copyright.

One but need turn to the nearest print shop to find that all the photogravures and engravings of every description on sale are foreign made. Further than this, the subjects of the pictures are foreign to our life and to our institutions, so that for patriotic as well as for business reasons we should see to it that this loophole in the copyright law is closed.

The late celebrated engraver Ritchie, he who engraved such plates as "Martha Washington's Reception" and "Sherman's March to the Sea," told me that it would never be profitable to print from American plates while the present law stands. Still another blow to the engraving business is a provision in a later law permitting all prints having a name scribbled in pencil on their corners to be entered as "Artist's Proof," free from duty. So that now nearly all foreign engravings are alleged "Artist Proofs," and can be purchased for less than the paper and printing would cost if an American engraving.

The Hon. Josiah D. Hicks, of Altoona, Member of Congress for the Twentieth Pennsylvania District, introduced a bill to amend the inadequate proviso in the prevailing copyright law. This paragraph of his bill read as follows:

"Provided, that in the case of a book, photograph, engraving, etching, chromo or lithograph, the same shall be printed from type set within the limits of the United States, or from plate made therefrom, or from negatives, or from engraved or etched plates or drawings on stone made within the limit of the United States, or from transfers made therefrom; and the importation of the same is prohibited."

Then the publishers inspired editorials saying that this bill was a blow at them, and, of course, they killed it. Mr. Hicks wrote me at the time that, if he could but get the support of the engravers of the country, he could carry the bill through. There was not at that time a single publication giving as much space to the engraver's art as Anthony's Photographic Bulletin now does, consequently few even knew that a bill in their interest was before Congress.

This is the first time that the subject has been brought to the attention of process workers, and if they but interest themselves now by writing to their representative they can secure remedial legislation during the coming Congress that will bring a revival in all the higher grades of process work.

REPRODUCING PAINTINGS IN VIENNA.

The Government Printing Institute, in Vienna, is publishing an album showing various species of cattle. The originals are oil paintings, and Privy Councilor O. Volkmer tells in Dr. Eder's "Jahrbuch" how the negatives for these fac-similes in color are made:

The paintings are copied in a sunlit studio, the direct light of the sun being softened by ground-glass. A collodion emulsion prepared by Dr. E. Albert, of Munich, is used. This is orthochromatized by the addition of erythrosine and picric acid, in the proportion of 1 part of these pigments to 10 parts of emulsion. The exposure with a Zeiss anastigmat of 37⅝ inches focal length, using the smallest stop, being six to eight minutes.

A hydroquinone developer, suggested by Dr. Albert, is used as follows:

I.

Sulphite of sodium	250 grams.
Caustic soda	200 "
Water	500 cubic centimeters.

II.

Alcohol	100 cubic centimeters.
Hydroquinone	25 grams.

III.

Bromide of ammonium	25 grams.
Water	108 cubic centimeters.

For use: Mix 100 cubic centimeters of I with 5 cubic centimeters of II and 5 cubic centimeters of III. Fix with hyposulphite of soda, and intensify as usual.

ENAMEL VERSUS ALBUMEN AND BITUMEN.

Mr. H. Vernon Torey, in the *Process Photogram*, says that he has personally tested all three processes, and must unhesitatingly give his allegiance to the enamel in preference to albumen or bitumen for the following reasons: It is decidedly the best acid resist; it gives as sharply a defined image as bitumen, consequently a much better one than albumen; is easier to develop than its predecessors; does not require rolling up like albumen; is not brittle like bitumen, so has no tendency to chip during development, and when made into a sensitizing solution will keep as long, or longer, than its opponents without deteriorating.

This is his formula for the bichromated albumen sensitizer:

White of one egg, generally	1 ounce.
Saturated solution bichromate of ammonium	1 “
Water	9 ounces.
Ammonia, .880	10 drops.

For bitumen he finds the following formula to work well, but requiring careful development:

Sensitized bitumen	240 grains.
Benzol	5¼ ounces.
Oil of lavender	5 drams.

Another and perhaps more easily controllable formula is:

Sensitized albumen	400 grains.
Benzol	1,750 minims.
Oil of lavender	120 “
Ether	240 “

A thoroughly reliable working formula for enamel he claims to be:

Fish glue (Le Page's clarified)	1 ounce.
White of egg	1 “
Bichromate of ammonium	30 grains.
Water	1 ounce.

Some workers add 1 or 2 minims of .880 ammonia per ounce of solution; others add the same proportion of 10 per cent. solution of thymol. Both these undoubtedly act as preservatives. Chromic acid is added by some workers in proportions varying from ½ grain to 2 grains per ounce of solution.

This solution, he adds, works well, both on zinc and copper, though many people dislike fish glue on zinc on account of the trouble experienced in burning. A pale straw color is some people's idea of how a burnt-in enamel zinc plate should look, while others are satisfied with nothing less than stony blackness. Between these two extremes the happy mean is found which, as well as words can describe it, is a chocolate brown just verging on a black. A zinc plate heated to this pitch, not too rapidly, neither carbonizes the resist nor disintegrates the zinc sufficiently to affect its etching. A copper plate, burnt in over a good heat, generally oxidizes by the time the enamel has been sufficiently baked.

The chief advantage claimed for bitumen alone of all the sensitive coatings suitable for process work was the possibility of stripping negative films and squeegeeing them on to its surface. This can be done with enamel, providing the films are dried and no water is allowed to touch the coated plate. After drying, the films must be brushed over with spirits of turpentine; the coated plate is served in the same manner. When the plate is covered over with films, a sheet of clean blotting paper is laid on and a roller or squeegee passed over. If the edge of any particular film shows a tendency to curl up, a touch of liquid gum placed under it will make it adhere firmly; the plate is then ready for printing without a printing frame. After exposure, the films can be peeled off and stored away in a book for future use.

He sums up the advantages of enamel as follows: Fish glue is almost as sensitive as albumen. It develops more easily. Can be used in the manner just described with stripping films and, albumen cannot. Fish glue is, at least, eight times more sensitive than bitumen. It develops quicker. Gives as sharp an image. Clarified fish glue is more reliable than bitumen. Is a better acid resist, because not so brittle as the latter. Fish glue, therefore, has every advantage claimed for bitumen and albumen. Added to this it has a greater degree of sensitiveness when bichromated than the admirers of bitumen can ever hope for it, and an acid-resisting power that dwarfs that of albumen into nothingness.

THE BEAUTIFUL ARTOTYPE PROCESS.

This is the most beautiful of collotype processes, says the *Printing Times and Lithographer*. It was introduced to us as the patent of the now defunct Artotype Co. of New York. The results of this method are unsurpassed in delicacy and beauty. These are the different formulas employed in the process:

The printing plate is a piece of glass well cleaned and coated with:

Albumen	150	grams.
Bichromate of potash	3	"

The albumen is mixed with a few drops of ammonia and beaten to a froth. The potash is dissolved in the smallest quantity of water in a beaker over a spirit lamp. The less quantity of water there is in the albumen, the better the results will be. When the potash is dissolved, and while it is still over the lamp, add one or two drops of ammonia, until the deep orange color changes to a rather light yellow. This solution is now cooled and added to the albumen. The mixture is then ready for use and will keep for a considerable time.

With a flat camel's-hair brush coat a glass plate with this solution and lay on the level bed of a drying oven heated to 110 degrees Fahr. When perfectly dry, this plate is laid face down on a piece of black velvet and exposed to light until the albumen becomes insoluble. It is then coated with this solution:

Gelatine (very soluble)	160	grams.
Bichromate of ammonia	30	"
Water	2,400	"

The plate is placed level again in the drying box, and dried at a temperature of 110 degrees Fahr., after which it is again coated with:

A.

Gelatine	75	grams.
Water	1,000	"

B.

Isinglass	75	grams.
Bichromate of ammonium	18	"
Water	1,000	"

C.

Chrome alum	10 grams.
Bicarbonate of potash	2 "
Water	200 "

Mix A and B together, and to 100 grams of the combined solutions add 2 grams of C. When the plate is coated with this solution, it should be dried as before. The thinner the emulsion of the last coating of gelatine, the finer will be the grain. If the gelatine solutions are quickly dried, the grain is apt to be very coarse, and this facilitates printing. Slow exposure on a weak light forms the coarseness of the grain. The quicker the exposure, the finer the grain. Ten or twelve minutes' exposure in the shade is about right. After exposure, the plate is immersed in water until the color is gone. It is then wiped off with a sponge, the back sprinkled with spirits of turpentine. It is now laid on the strong glass bed of a lithographic press and is ready for printing. If the printing surface is found too soft, it can be hardened by an application of nitrate of lead. The printing is an operation that requires the greatest possible skill, but the results are unapproached for accuracy and delicacy by any other photo-mechanical process in permanent printing ink.

PROCESS NOTES.

In etching zinc plates, the addition of a little chromic acid to the nitric acid etching bath is recommended.

* * *

For the thorough cleansing of zinc and copper plates before the application of gelatine or albumen solutions, it has been suggested that they first be cleaned with soda and whitening, and finally with zinc oxide.

* * *

A solution of formalin, as weak even as 1 per cent., will harden gelatine or glue enamels sufficiently to withstand the attacks of weak acids before the operation of "burning in."

* * *

An actinometer is essential in photo-lithography, to determine the proper exposure of the photo-lithographic paper, and the paper used in the actinometer had better be a strip of the photo-lithographic paper used.

* * *

In reference to a note in this department last month recommending the use of a black velvet backing to process dry plates to prevent reflections, one of the large dry-plate manufacturers wishes to add that the only absolute preventive of reflections and halation is the use of a light-absorbing paste on the back of the dry plate, and for this he recommends a simple flour paste colored with caramel or burnt sienna. This can be wiped off with a damp cloth before development. Anti-Halo is the name of a ready prepared backing for this purpose.

Photographs are now made on silk as on albumen paper. These are colored with pastel, and the latter fixed by spraying over the whole a solution of rubber in benzole.

* * *

Anaglyphs, the name given by M. Louis Ducos Du Hauron to the new stereoscopic pictures, are now made by Mr. Alfred F. Hatch, of Philadelphia. Each picture is printed from half-tone blocks in two colors, red and blue, superimposed on one another, but out of register. The pictures can be in size as large as 16 x 24. The colors being out of register give an appearance of confusion most confounded. When viewed, however, through a pair of spectacles, provided with a blue glass for the right eye to see the picture through, and a red glass for the left eye, the blur disappears and the objects in the picture stand out in relief.

* * *

Gum turmeric has been suggested by a writer in *Photographische Chronik* as a substitute for asphaltum as an acid resist. The formula is thus given :

Chinese turmeric	10	parts.
Alcohol	100	"
Oil of lavender	5	"
Methyl violet, saturated solution in alcohol	2	"

The above solution is used as bitumen or asphalt is, only that the development is with alcohol. It can be used on paper and treated as in photo-lithography, without inking. The developed turmeric transfers to stone like transfer ink, and is etched in the same manner.

* * *

A thoroughly efficient plate-holder for half-tone work should possess many features not found in the ordinary plate-holder. It must, of course, be adapted for both lined screens and wet plates, and a holder that will permit of the use of any size of screen and any size of plate is desirable. It being necessary that it withstand the action of the various chemicals used in wet collodion work, the holder should be very strongly made, and strength should not be sacrificed for compactness and portability, for in the wet-plate holders these are of little account. The metal parts liable to come in contact with the plate should be of silver, or some other suitable metal that withstands the action of nitrate of silver. Provision must be made for catching the drippings from the plate. The old method for using various sizes of plates and screens was by the adoption of kits of various sizes ; but this is a clumsy way, objectionable for many reasons. The well-known Benster principle is probably the best, and a holder constructed on these lines, in which no kits are necessary and in which plates and lined screens of all sizes up to the largest for which the holder is designed can be used, has recently been placed upon the market. By means of a milled screw on the outside of the holder the distance between the plate and the screen can be regulated to a nicety. We commend this holder to all engaged in photo-reproduction.

WHAT A LITTLE RE-ETCHING WILL DO.

ALL enamel half-tone etchers of to-day, who formerly used the old albumen process on zinc, fully appreciate the numerous advantages the enamel process has given us. Such roundness and softness can be obtained, or, in other words, the gradation from a light to a solid can be made so much better. But the principal thing that I desire to call attention to is the manner in which we can stage, re-etch or fine-etch an enamel half-tone on copper.

Examine the two half-tones of the Old Mill, Strong, Maine, Nos. 1 and 2. They are both made by the enamel process on copper. No. 1 is what we call a straight etching, *i.e.*, the print is made in the ordinary way and etched in a good fresh solution of chloride of iron from eight to twelve minutes. No. 2 is made exactly the same, excepting at the end of about a five minutes' etch it was taken out to stage a little or paint in a few of the dark places, such as the door, windows, the shadow underneath the old mill, the window in the blacksmith shop in the distance, also the sign, and patches on the wood pile by the side of the building. It was then put in the solution of iron again and etched about seven minutes longer. A flat proof was then taken of the two plates, and they were found to be the same, excepting the dark shadows, which were a little stronger in No. 2.

As the sky required lightening, the old mill, trees and foreground were painted in with asphaltum and the plate etched sufficiently to brighten the sky, after which the asphaltum was removed and another flat proof was obtained. Next the high lights in different parts of the subject, such as the windows, water-fall, the road in the distance, were improved by what is called "fine-etching." A camel's-hair brush dipped in a strong solution of chloride of iron was applied to those parts, great care being exercised not to carry them too far, and when they seemed to be etched far enough, the iron was absorbed from the plate with a piece of blotting paper. Then the plate was washed with alcohol, using a soft cloth.

The flat proof now taken was as No. 2 appears. If it had been found that further etching was necessary, it could have been readily done; whereas if it had been an old albumen print on zinc, you could not keep re-etching and getting proofs if the first one was not satisfactory. One can readily see what an advantage it is to be able to stage, re-etch or fine-etch a half-tone plate. The two etchings of the Old Mill show this very well.

H. WOODBURY SHAYLOR, Jr.

A PRINTING frame for photo-engravers must be very strongly made to permit of the obtaining of practically any degree of pressure between the backboard and plate. To obtain the degree of strength necessary, the screws should be of iron, and the bolts holding the hinges and the clutches must pass through the entire width of the frame, the nuts being underneath. If this is not the case, the hinges will be dragged away from the frame itself.

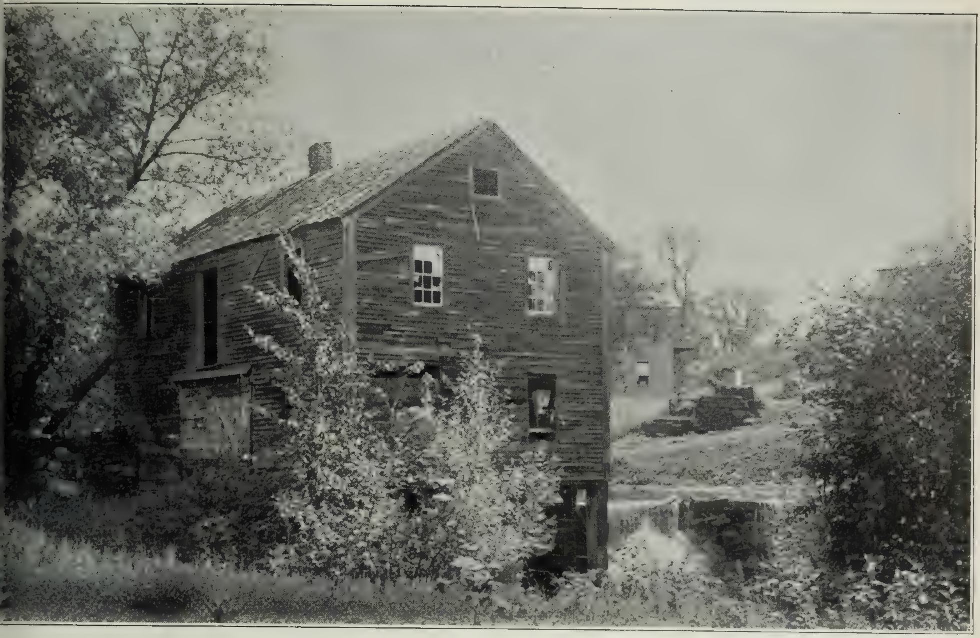


Fig. 1.

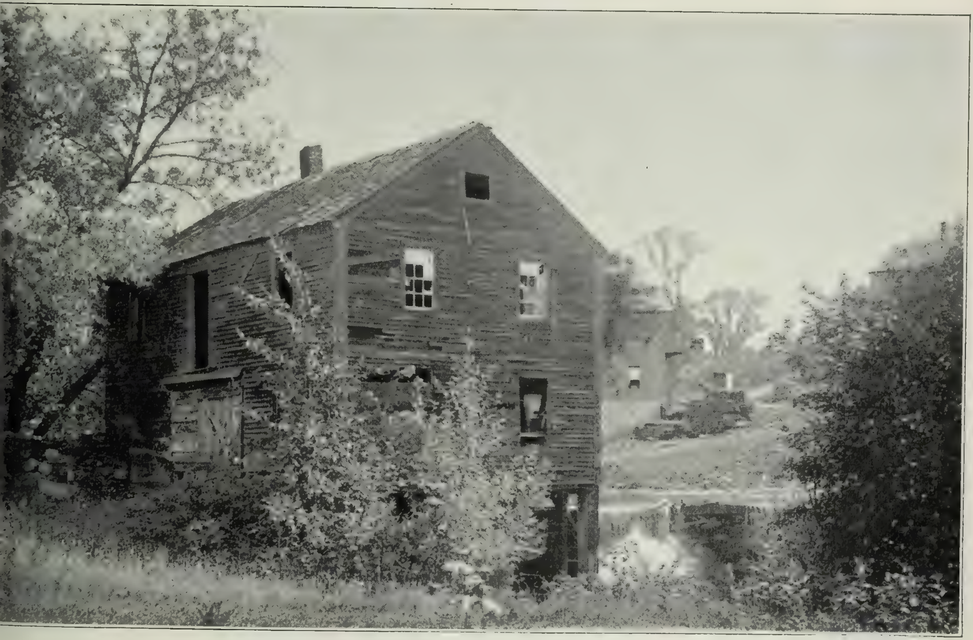


Fig. 2.

OLD MILL, STRONG, ME

THE Bas Relief Photographs, alluded to editorially, should be seen by every photographer. They are a distinct novelty, and are certainly very artistic.

THE INTERNATIONAL ANNUAL AND AMERICAN PROCESS YEAR BOOK promises to be an immense success. Photograph making and photo-reproduction are inseparable, and every one, even the amateur with his roll-film camera, should be acquainted with the methods adopted in producing printing plates for illustrative purposes. The Annual will be illustrated by American photo-engravers, which means much. It will be a library in itself.

THE TRADE NEWS, a monthly published by W. D. Gatchel & Sons, of Louisville, Ky., and Birmingham, Ala., is an excellently edited publication, which will be found particularly useful by the professional photographer. It is modeled on the lines of *The Professional Pointer*, and, like the latter, will be a welcome visitor.

WE would call the attention of our Spanish friends to *La Revista Cientifica Hispano-Americana*, a photographic monthly published by E. & H. T. Anthony & Company. Valuable matter on photography and photo-engraving appears therein, and every issue is copiously illustrated.

MESSRS. PERCY LUND & COMPANY have followed up Robinson's book, *The Elements of a Pictorial Photograph*, with one scarcely less valuable—*Artistic Landscape Photography*, by A. H. Wall. The making of a photograph is not difficult; the making of picture is another thing. Mr. Wall's book is a very valuable addition to the literature of artistic photography.

PROCESS workers will do well to investigate the merits of the new process printing frames manufactured by E. & H. T. Anthony & Company. The object aimed at has been to produce a frame that will admit of a maximum of pressure with a minimum of liability to breakage. The hinges are bolted clear through the sides of the frame, as are also the clutches, and the iron screws give an element of strength not attainable with wooden screws.

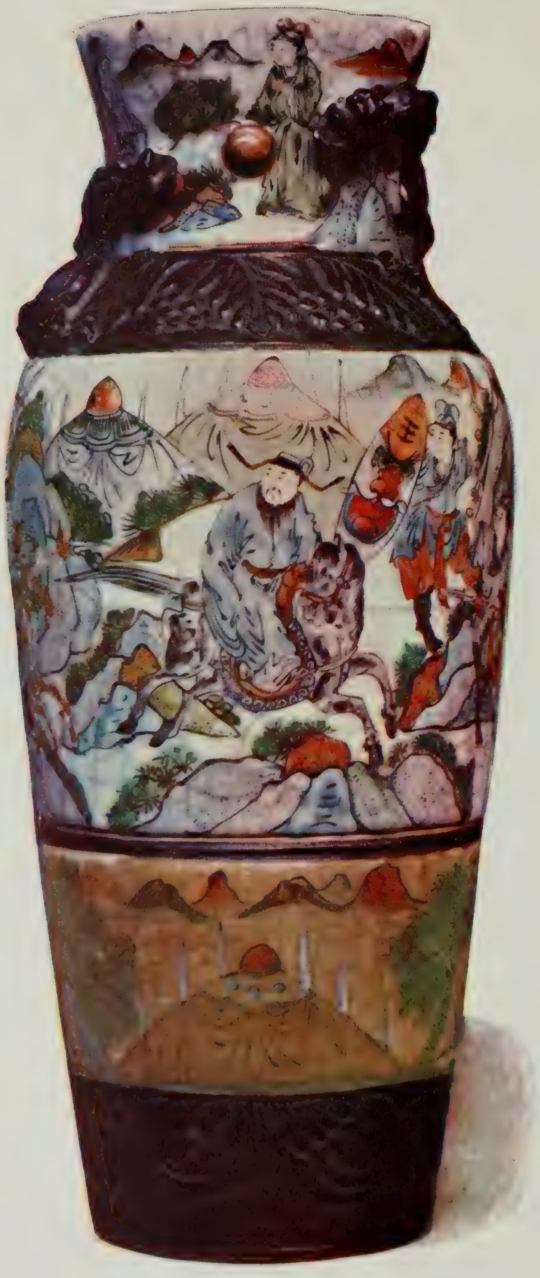
OUR friends are cordially invited to send in specimens of their work, either for publication or for review. Photographs, designs, half-tones and any matters of general interest are welcome.

THE advertising columns of the BULLETIN may be used without charge by those desiring to obtain employment.

WE acknowledge the receipt of the *Hansei Zasshi*, a Japanese monthly having as its object the propagation of Buddhism. The frontispiece is a page of half-tones, photo-engraved and printed by K. Ogawa. The engraving and printing would be a credit to any establishment.

THE X RAYS, by Arthur Thornton, M.A., is the title of a new book published by Percy Lund & Co. The subject is treated in an elementary manner, yet all necessary information is imparted. It is a book for the average man who is not posted on electricity and physics generally. After a perusal of this work, we can recommend it to all students of radiography.

THE INLAND PRINTER, with its attractive cover, is a conspicuous object on the news stands. As a sample of American advertising skill its ads should receive the attention of our foreign readers.



[illegible] of Three-Color Process
Engraving & [illegible] Printing Co.
[illegible] and 75 Hartford Sts.
Boston, Mass.

ANTHONY'S

Photographic Bulletin.

EDITORS:

Prof. CHARLES F. CHANDLER, Ph.D., LL.D.
FREDERICK J. HARRISON.

Vol. XXVII. OCTOBER, 1896. No. 10.

OUTDOOR PROFESSIONAL PHOTOGRAPHY.

THE studio photographer has but little idea of the enormous quantity of photographic work done by his brother of the camera who confines himself to outside work, architectural, theatrical, illustrative, etc. Yet here is a field greater than that offered by gallery work, for the camera is called into requisition in every art, science and business. Much of this class of work might have been under the control of the studio photographer, but, with characteristic indifference, he has let it slip, little by little, until there is now every prospect that theatrical work, once his entirely, will be taken from him by the outdoor man. The gallery photographer, confined by his four walls, is apt to become cramped in his ideas, to settle down to a somnolent existence, waiting for patrons to come in, and availing himself of none of the improved methods or opportunities that arise. The outdoor man, on the contrary, is a continual hustler, is brought into contact with every side of human nature, becomes in a very short time a shrewd business man, and hunts up business instead of waiting for it to hunt him up. Look at it as you may, it is a fact that the outdoor man deserves the business he gets. He is ever on the alert, is much more capable than the average indoor man, has apparatus for work of all classes, and is ready at a moment's notice to do any class of work, from photographing a plush chair to an audience in a theater. The indoor man is gradually narrowing the circle of his business and is complaining of hard times. The outdoor man takes in everything and has no complaint. As an example, Sarah Bernhardt's pictures are good sellers and a profitable investment for the photographer. The average pictures by indoor men are stilted and familiar. On her last visit to New York, an outdoor man photographed her at her hotel, in easy natural poses—in

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fact, Bernhardt at home in private life. The outdoor man did not retire on the fortune thus made, but he netted a considerable amount, advertised himself very considerably in one of our leading monthly magazines and secured introductions of no little value. And in theatrical work in particular has the outdoor man ousted his penned-up brother. In New York City the bulk of the work used to be made in the gallery. The perfection of flash-light photography, the improvements in apparatus generally, and the industry, ability and persistence of the outdoor man, have resulted in his almost completely capturing this class of work. After the performance, when the gallery man is in bed, he is on hand with compact and portable kit. The company know him, and willingly pose, and there, amid proper surroundings, he does his work, swiftly and well. The studio operator hardly realizes to what degree of perfection flash-light photography has been brought. The half-tones, illustrating theatrical work, distributed through this issue of the BULLETIN, show what can be done, and are the work of Mr. J. Byron, probably the leader in this branch of photography. Three are from flash-light negatives made in the theater, after the audience had gone ; the other is an example of home portraiture.

Photography in the theater, in the home, in the office, in the store, in fact, on the spot, is the key by which the outdoor man gains entrance, the note by which he obtains a hearing. The English photographic journals occasionally publish accounts of a certain photographer who makes a specialty of home photography. He is evidently considered something of an anomaly, for whenever the subject of photography in the home by professionals is touched upon, his name, and his only, is brought in as an example. Of American photographers having galleries and pushing outdoor or at-home work, we can mention many. Yet even they are suffering from the encroachment of the outdoor man who gives his whole attention to this work. The professional has, we venture to suggest, narrowed his business down to what he terms the strictly legitimate. To the photographer whose sole ambition is the exercise of his artistic taste, this is satisfactory enough. But the business man, to whom photography is first a source of income, cannot quietly contemplate the slipping away of many profitable branches. How many photographers know anything of the reproduction processes ? How many are acquainted with the difference between photogravure and zinc etching ? How many have flash-light apparatus and portable outfits ? How many lack the knowledge necessary for outdoor work ? How many are complaining of hard times ? This matter of outside photography is an important one, well worthy the attention of every professional photographer. The illustrated magazine is very much in evidence, and photographs for such illustrations are necessary. These might be supplied by the studio photographer as well as by the outdoor man. The photographer has lost the photo-engraving business, he is fast losing all outside work, and, unless an effort is made, there is strong probability of the gallery man's sphere being still further contracted.

Items of Interest

IT is said that a record of the movements of the heart may be made by the aid of photography. A very sensitive microphone is placed on the chest and is connected with an optical telephone, in which the diaphragm forms Newton's rings. An optical system illuminates the diaphragm and the image is received on a piece of sensitive paper, moving at a given rate, so that a curve is traced out by light and afterwards rendered visible by development. Some six months ago we saw results showing the "murmurings" of the heart, made after a method somewhat similar to the above. Photography is daily becoming more useful to the physician and surgeon, and is well worthy of their close attention.

* * *

A PIECE of glass smeared with putty will do as a makeshift when the ground-glass is broken and a new one cannot be obtained. A celluloid film covered with matt varnish makes a good unbreakable focusing screen.

* * *

NEVER pack plates with newspaper in contact with the sensitive surface. Use pure white tissue or filter paper, and, if neither are obtainable, lay the plates film to film without any separators.

* * *

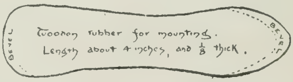
SALTS of lemon, mixed with warm water, will remove gold stains from cloth and linen goods without injury to the latter.

* * *

As a hardening or toughening solution for gelatino-chloride papers, potash alum solution is usually recommended. The best solution is said to be that made by dissolving 1 part of pure sulphate of aluminum in 70 parts of water. This can be used repeatedly until it loses its power or becomes turbid, when it should be discarded.

* * *

THE accompanying cut shows an instrument devised by Fred. H. Davies for rubbing down prints during mounting. It is constructed out of an old boxwood rule, the ends being beveled and rounded with glass paper. A piece of waxed or parchment paper is interposed between it and the print, to prevent damage to the latter.


Wooden rubber for mounting.
Length about 4 inches, and $\frac{1}{8}$ thick.
BEVEL
BEVEL

Otto Lilienthal, known to fame as a daring and expert aërial navigator, died from injuries received while using his flying machine. Several photographic reproductions showing the machine in actual flight have appeared in our German contemporaries, and there is little doubt but that he did much to re-awaken interest in the problem of aërial navigation.

* * *

Dr. J. de Nobele suggests the application of photography for detecting malformations of the body and uses a frame, across which are stretched at frequent intervals cross wires. The screen is placed as close as possible to the subject, and the whole is photographed. This method was carefully described and well illustrated in "The International Annual," vol. vii, page 116.

* * *

The September number of *The Practical Photographer*, published by Percy Lund & Company, is indeed a novel one. "Photography and Photographers in Japan" is the title of the issue, and our good friend, W. K. Burton, leads off with a capital article in which he says he will not be at all surprised to see Japan excel all other countries in the matter of photography as an art. "With the Occidental," he says, "artistic taste is a thing that has, as a rule, to be acquired; with the Japanese it is inborn. The coolie who trundles his fare along in a Jinriksha has probably a more refined taste in what is beautiful than the average University man in England who has not had any special art training." The illustrations with which the issue abounds bear out Mr. Burton's statements, and the photographers of Japan will be held in future in no little respect. The bulk of the articles are by Japanese photographers, and the highest praise is due the editor and publishers of *The Practical Photographer* for their enterprise.

* * *

There is no studio in Japan in which "tintypes" are made. Glass positives, mounted in light wooden boxes, are, however, sold.

* * *

The cover of the Japanese edition above referred to is by T. Hasegawa, of Tokyo, and is a truly creditable piece of work. It is in no less than twenty printings, and between four and five months were occupied in printing and crinkling them.

* * *

Mr. Y. Isawa, the editor of the "Shashin Sowa," has an interesting article in the coming volume of "The International Annual" on "Substratum for Collotype Printing." Mr. W. K. Burton is also represented therein, his paper being titled "Art versus Science."

* * *

A photographer of Newquay, England, has announced that he has discovered a practical process of photographing in colors. He has

MADAME SAVILLE.

PHOTO BY J. BYRON.

Flash-Light at Home.

been challenged to produce his results, and quite a little controversy has been raged in the town newspapers. We are among the sceptical, but await further developments with interest.

* * *

It is said that fourteen years ago only 83 pounds of aluminium were produced in the United States; that last year nearly 900,000 were turned out, and that the output this year will be still greater.

* * *

For the washing of bromide enlargements, simply soaking in water is almost futile, for it really amounts to immersing the print in several weak solutions of hypo. C. Welborne Piper recommends vertical washing with a horizontal spray as being much more effective and rapid. If the force of water is very great, a rose with rather coarse holes should be attached to the faucet. Very fine jets coming with force on the film might puncture it. The rose should be kept on the move, and the washing commenced at the top of the print, so that the dissolved hypo may be discharged from the bottom end of the dish. The back of the print requires as much washing as the front.

* * *

The same writer, in the *Year Book*, recommends as a test for hypo in the wash water the following solution:

Potassium permanganate	2 grains.
Potassium carbonate	20 "
Water	20 ounces.

In the presence of hypo the pink color of the solution changes to greenish yellow or brown, or it may be discharged altogether.

* * *

We see it stated that plates may be changed by the aid of an ordinary bicycle lamp, if the latter is fitted with the red glass sent out by the manufacturers. This is, of course, entirely wrong. Too much care cannot be employed in loading plate-holders, and, despite the accounts, published at not infrequent intervals, of the safe charging of holders by the light of a candle placed behind a door or under a bed, it may be accepted as a fact that the less light of any kind used, the safer. As regards bicycle lamps, these are absolutely unsafe, unless such alterations are made as to cut off all actinic light.

* * *

A METER is equal to 39.37 inches, and is supposed to be the $\frac{10}{10000000}$ part of the distance from the Equator to the North Pole. The gram is equal to .3527 ounce, or 15½ grains, and is the weight of that quantity of distilled water at its maximum density which fills the cube of $\frac{1}{100}$ meter; that is, the weight of a cubic centimeter of water. The liter is equal to 1,000 cubic centimeters, or 34 fluid ounces, or 2⅛ pints.

Photography and cycling go well together. It will not be very long before there will be cycling sections in most of our photographic societies, and photographic sections in the cycle clubs.

* * *

Retouching is but seldom attempted by the amateur, but it may be successfully practiced if patience and care are exercised. Wilfred Emery, in *Photography Annual*, gives many useful hints to those about to learn retouching, pointing out that true retouching consists in improving exaggerations in lighting, correcting false shadows, which frequently cause wrinkles to appear much deeper than they are, and softening the texture to make it look like skin. A retouching desk, two or three pencils of varying degrees of hardness, a fine sable brush, a cake of Indian ink for spotting out transparent holes, a piece of sandpaper for sharpening the pencils and a bottle of retouching medium comprise the necessary outfit.

* * *

A rough proof of the negative to be retouched will be of considerable assistance. It is not a good plan to sit too close to the negative, for an undecided and uneven touch will thus be acquired. By sitting farther away, the general effect and modeling can better be observed, and the eyes of the retoucher will be subjected to less strain.

* * *

In the same excellent annual, T. C. Hepworth writes on lantern slides for use in the electric lantern: "There is a certain standard intensity for a lantern slide, which is very well understood by good workers. Such a slide will show up well with oil, better still with lime, and best of all with electricity. It may be compared with a piece of music by a good composer. If we have nothing better at command, we play it on the piano; it is far better on the organ, but if we want to enjoy all its beauties we must hear it performed by a full orchestra. He who possesses really good slides need be under no apprehensions that they will suffer from excess of light. The more intense and the purer the quality of the light, the better they will look."

* * *

When making exposures on buildings and subjects in front of which people are continually passing, it is a good plan to use a small stop and give a long exposure. Very little blurring due to the moving objects will then be noticeable.

* * *

The ninth volume of "The International Annual" will contain a very complete set of tables and formulas, giving not only the developers recommended by the various manufacturers, but a carefully assorted set of working instructions for all the processes useful to either amateur or professional photographer.

* * *

All matter for the November issue must be in our hands on or before October 18th.

RESEARCH WORK FOR PHOTOGRAPHIC SOCIETIES.

IN a paper read before the Hackney Photographic Society, Mr. Thomas Bedding dwelt on the manner in which photographic societies might benefit those following photography, and touched on several points the elucidation of which could profitably be undertaken. He said in part:

"With the suggestion that photographic societies might well co-operate in a concerted effort to provide the means for the greater encouragement of photographic research, I may next be allowed to point out that there still remains a wide field open for investigation work of a minor nature, which either individual photographers or societies might undertake at comparatively little cost of time or money. Take, for example, the question that has from time to time cropped up as to the replacement of hyposulphite of soda by a less troublesome but equally efficient fixative for negatives and prints. You are, doubtless, aware that the silver salts are more or less soluble in the alkaline chlorides and bromides, in the sulphocyanides, in sodium sulphite, and in ammonia. In the very early days the first named were used for prints, but did not answer satisfactorily, as they were said to be not perfect solvents. Potassium bromide was used with more success, although its action was slow, and the addition of strong ammonia to the hypo bath has been, and is, occasionally recommended to facilitate fixation. Sodium sulphite has been found to be a too weak solvent. The drawback to the employment of potassium cyanide for negatives and prints is that, being a fairly powerful solvent of metallic silver, it must be used weak and carefully, otherwise your half-tones are likely to suffer; but the sulphocyanides have been used as fixing agents, though they are somewhat inferior in power to hypo for the purpose. The greater solubility of silver chloride in these and other reagents suggests that, for paper prints, it might be possible more readily to displace hypo for fixing prints than for negatives. Probably the sulphocyanides, according to the stated solubility of the silver haloids in them, give most hope of success for the double purpose; but the entire subject is one that awaits exhaustive experiment, and is well worth taking up when we consider that, notwithstanding its excellence as a solvent, hypo has many well-known drawbacks, of which few of us are without experience. I suggest the subject as being well within the reach of individual experiment, as the work required is obviously not of a very complex character.

"The very interesting subject of orthochromatic photography demands in its higher branches—such as the effect and action of various dyes on gelatino-bromide of silver, and the determination of the spectrum sensitiveness of the preparation—an amount of care and close attention that the ordinary member of a photographic society is, as a rule, unable to bestow upon it; but there is one division of the matter that has recently come into prominence in which many are well qualified by time and endowment to take part. I allude to the alleged orthochromatic properties of sensitive plates not specially corrected for color. You are aware that it is held by many that by the use of suitably selected colored screens an ordinary plate may be made to yield an orthochromatic effect, but that the practicability of such a result is denied by others. Such a point as this—which appears to conflict with the theory generally held with regard to orthochromatic photography, viz., that the use of a colored screen on a non-color corrected plate merely increases the exposure without imparting to the plate sensitiveness to the less refrangible spectrum rays—is one well within the power of a fairly skilled worker to refute or confirm. On the other hand, the theory I have referred to frequently receives, in the experience of all of us, a very rude shock, for, no matter what color of glass or fabric we use in our dark-room lamps, are we not always careful to keep the light as much as possible from our plates, and do we not often find that some amount of exposure to that light produces fog? I myself have found this to be the case even with glass that has been guaranteed to cut out the actinic rays, and the experience is one that seems to contradict the theory of the non-sensitiveness of ordinary plates to yellow and red. But the conditions governing the reproduction of objects in color-correct values not only deserve more study than they receive, but it is quite certain that color-sensitive plates are not used so much as they ought to be. This is more especially apparent with the growth in use of half-tone blocks. These always strike me as having a tendency to degrade the color values of the originals, which might frequently be obviated by the employment of color-sensitive plates in the taking of the negatives.

"There is, again, the apparently simple but really complex question of development. This, it is true, receives a vast deal of attention at photographic society meetings, which, however, is seldom of a nature to make any reliable addition to our knowledge. For what are known as the newer developing agents, all sorts of advantages and properties have been claimed that have been admitted by some, and denied by others, on far from complete evidence. It is really a difficult matter to convince most old workers that for negative work pyro-ammonia and pyro-soda, and for bromide paper ferrous oxalate, are excelled by more modern compounds, and this is not surprising when we consider that no attempt has been made to demonstrate by scientific means wherein the practical advantages of the newer reagents are supposed to lie. This is a branch of investigation eminently adapted to be taken in hand by photographic societies, for it would be a simple matter to lay down uniform conditions of working, within the limits of which any photographer of ordinary intelligence could keep himself. It is questionable, however, whether the matter is now really worth taking up until a problem of much greater importance has been solved; I allude to the nature and constitution of the latent or undeveloped image, a subject that appears to have been lost sight of during recent years. It may be fairly conjectured that, when this fascinating but elusive secret of science has been unlocked, development will enter upon a new phase, and that, therefore, we are at present dealing with an unknown product, which leaves us very much in the dark as to what development really is—I mean, of course, the precise action that takes place in the reduction of the exposed surface.

"In determining the merits and properties of a given printing process, or for making comparisons between various papers, so far as their power of rendering the scale of gradation contained in our negatives is involved, or, indeed, for arriving at the actual scale the paper is capable of depicting, the members of a society, all working under determined equalized conditions, might accomplish some really valuable work. It is matter for surprise that comparative experiments of this kind should be virtually neglected, and mere individual expressions of opinion or solitary experiences relied upon in preference. This suggestion is obviously typical of others in which advantage might be taken of the circumstance that a number of workers, as represented by a photographic society, could avail themselves of the opportunity of studying a subject concurrently, and of subsequently comparing results.

"These illustrations, indicative of the existence of easily traversed by-paths in experimental photography, are merely typical, and might be almost indefinitely increased; but those I have chosen serve, I hope, to prove my point, that there is a wide field open for research work of a minor kind. Nevertheless, I am appealing less to individual photographers than to members of societies collectively to divert a portion of their efforts in this direction. The difficulty of filling a season's programme is one experienced and complained of by nearly all honorary secretaries; but that difficulty, I venture to suggest, arises from the habit they have of too often looking away from home for men and material. Most societies nowadays include within their membership one or two men of more or less chemical and physical knowledge, and few are without several of proved photographic ability. Would it not be possible, then, for these societies, utilizing the knowledge possessed by such members, occasionally to depart from the beaten track of set demonstrations, papers, discussions, or lantern evenings, and systematically to undertake and report on the investigation of some of the innumerable little chemical and other problems which modern photography still offers for solution? A great deal of useful knowledge, even of a negative character, might be gained in this way. In their collective capacities, societies hold exhibitions and excursions, and they undertake surveys, the publication of journals, and so forth; so why not a little serious work in the shape of research? Of course, one always thinks the most of one's ideas, and I fancy I discern in the one I am tendering you the germ of what possibly might prove to be a valuable movement; for assuredly a combination of some three hundred societies, all willing to aid in research work, could be made a powerful factor in photographic progress.

"It is, perhaps, of use to remark that one of the drawbacks to individual experiment or research is to be found in the circumstance that confirmation or verification of one's results is not always to be had. This difficulty is one that vanishes in the case of a society possessing several members competent to undertake such work, and is another argument in favor of my suggestion.

"All that I have hitherto said is a plea on behalf of constituting photography a craft or science of precision. Photography, as an 'art,' is already well looked after. We have it on unimpeachable authority that it demands little or no photographic knowledge, and therefore it does not exact precision of aim or application. It demands imagination, and in recent years, at any rate, it has had it to such an extent that humble mortals like myself have occasionally been driven to conclude that the authors of many so-called art photographs have relied too much upon their imaginations, or have exercised them when they are in a condition of disease or decay. It is time, I venture to submit, that the technical photograph had its share of popular attention and applause. We have exhibitions, occasionally of a peripatetic character, devoted to pictorial photography, in which photography, *qua* photography, plays a part of relatively small importance; do you not think, therefore, that an exhibition exclusively devoted to technical photographs would come as a welcome change?"

Photographic societies generally have commenced active operations, and the suggestions of Mr. Bedding should receive careful attention. A society exists for two principal reasons: the advancement of photographic knowledge of the individuals composing the society, and hence for the general advancement of photography; and for the furnishing, at a trivial cost, of the best of apparatus and general appliances. A systematic study of one or more of the problems above alluded to would give zest to the meetings, would encourage scientific men to take part in the proceedings and would be beneficial generally.

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Cameras specially made for bicyclists are now manufactured, and will be found extremely compact and portable, and in every way as efficient as the more bulky outfits. A useful addition to the cyclist's outfit is a ball and socket tripod screw, having an attachment for gripping the handle bar of the bicycle. When one is alone, there is some little difficulty in finding a support for the bicycle; but, where there are two machines, these can be interlocked at the handle bars, and will thus form a steady support for the camera. Particular care should be taken with bicycle cameras to use a dust-proof case, and to clean the camera at frequent intervals. A rubber case for the camera itself, in addition to the outside leather case, should be used. This will serve as a very efficient dust and damp protector. Too much emphasis cannot be laid upon this point of taking every precaution to keep the dust from the camera and plate-holders, especially in cameras that are carried on the bicycle, where the maximum of dust is encountered. When cleaning the lens, before polishing with a soft rag, care should be taken that there are no particles of dust on the glass or brass, for if there be such, there is great danger of scratching the surface of the lens, which, while it may not do any great damage to the lens from a photographic point of view, will certainly mar its appearance, and by no means increase its efficiency. The shutters, too, should be carefully handled, and if any stiffness in the working is observed no attempt to force the parts should be made. A piece of grit may be the cause of the trouble, and a little careful handling will probably dislodge and entirely remove it. Again, in the plate-holders dust is very likely to gather, and these should be very carefully dusted with a clean camel's-hair brush every time they are re-charged with plates. Film-holders, too, will be benefitted considerably by the occasional use of the dusting brush.

WITH THE DELAWARE OYSTER FLEET, PHOTOGRAPHICALLY AND OTHERWISE.

DURING the latter part of the winter of 1895, while on a business trip in the southern part of New Jersey, I had occasion to overhear some rather startling yarns about the Delaware oyster fleet, and the oyster pirates who infest that whole region.

These tales were told while enjoying an after-dinner smoke around the stove in the common room of a typical New Jersey inn. My speakers were also typical Jerseymen of the most approved sort. The surroundings and the wild weather outside all gave edge to my growing curiosity. Hence I asked many questions relative to the great oyster industry, and I succeeded in quite thawing out one of the narrators, a man who had seen much service with the oyster fleet, and was therefore capable of talking well on the subject.

Needless to go into a long explanation of "riparian rights, growing grounds," etc., etc., further than to say that all agreed that the State of New Jersey would not protect the riparian rights of the owners on April 1st, when the Government grounds would be open for securing the young oysters for planting. Hence the owners would simply be compelled to take the law into their own hands, and arm themselves with a few good old muskets. I furthermore learned that the meeting of the entire fleet on April 1st, some seven or eight hundred vessels, would be a sight of sights, and not one often enjoyed by the average amateur photographer. Using diplomacy, I was invited to come down on March 31st and see this fleet in all its glory on the great day.

On my return home I asked a friend to accompany me. He gladly accepted my invitation, although not interested photographically. The month of March having gone by, I wrote to my oyster friend, to find out if the invitation was still open, and received his affirmative reply.

We set off for Jersey on Sunday, March 31st, taking train for the town of "X," where, after discussing supper, I made arrangements with a very genial liveryman to drive us in his two-horse team to the village of "Z."

My photographic baggage consisted of a first-class hand camera in a leather case, likewise numerous plate-holders, all loaded and ready for action, as I thoroughly believe in plates rather than films.

It was cold and very windy, hence driving in an open carriage was far from being a luxury. The night was as black as ink, and the driver insisted on telling us tales of highway robberies of late occurrence on this self-same road, by way of raising our spirits. Furthermore, he informed us that his horses, over which he went into ecstasies, were generally used for drawing the town hearse.

Our minds were very much relieved when we arrived at our destination and entered the hospitable old inn, where we found my friend was awaiting us. A chat and a warm-up followed a very cordial reception, and we were promised some rare sights on the morrow, and told that the fleet would be larger than ever, in fact that it would muster nearly a thousand strong. We were rather dismayed, however, when informed that we must turn out at 1 A. M. This for me beat every record, so I voted for bed at once, it being now about 10 P. M. We were shown into very cosy rooms, and, after getting our "old clothes" and traps together, we jumped into bed.

At 12.45 A. M. we were called, and dressing ourselves like perfect tramps in the aforesaid "old clothes," we found our friend Joe, the oysterman, waiting for us in the road. He was accompanied by another chap, who proceeded to load us with a lot of truck, in the shape of oars, sails and mast, ropes, etc., although we were already loaded with a large lunch basket and my camera.

The morning (?) (pitch black night would have been a better name) was very cold, raw and cheerless; in fact I did not care for its appearance, as it seemed to indicate that rain was not far off.

We were in for it, however, so off we started down the black road, going, I thought, Heaven knows where. We tramped, loaded like mules, for about half an hour, when Joe lighted a lantern he had with him and informed us that his sail-boat ought to be near at hand, but as I had seen no water I thought he was joking, though soon found it no joke when I came near falling into the water myself.

We were, in fact, at the upper end of a long creek, where the boat was found. All our goods and chattels were piled in, and our party of four was soon afloat. Now began the most weird trip I have ever taken in my life. Joe's friend took to the oars, while Joe himself steered the boat. The light of the lantern was dimmed because it only made the darkness seem greater. We had hardly started when the order was given "low bridge," and we had actually to sprawl into the bottom of the craft, as we went under a bridge which just allowed the boat to pass, and, though the oar locks were removed, we scraped the gunwales. This was indeed delightful.

A light was made out ahead and we steered for the bank, where we shipped a dark figure with his baggage. To make a long story short, we shipped about fourteen men in all who silently took their places in the boat, while we were on this everlastingly long trip. It was not until daylight that I learned that this creek was 6 miles in length and had twenty-one reaches; in fact it was like a snake, though I did not realize this until I had to help to row back.

The men who had so silently come on board were oystermen bound for their vessels, which were anchored at the mouth of the creek in the Delaware Bay, all waiting for daylight to start for the Government oyster grounds.

Well, we pulled and we rowed until I wondered more and more where in the name of goodness we were going to. Little was said, and that in a whisper. The night air was terribly cold, and my friend and I were a miserable pair of tourists. More than once I asked myself why I had come on such an expedition, cramped up in a small sail-boat, in company with men of whose ways and intentions I had not the most remote knowledge. Cold and dreary, we huddled together for warmth and sympathy, until at last I heard we were nearing the mouth of the creek.

Here we found an oyster vessel, which had failed to get off at high tide, and it was fast stuck in the mud. Being hailed, we went aboard this craft and helped to get her off, which we did by working at the windlass, and succeeded after long and persistent effort. We then made a break for the "aft" cabin, and soon got around the fire, as we were chilled through and through.

No words can describe our utter wretchedness. I really think that had my camera dropped overboard I would not have cared a jot. All I wanted was a good red-hot stove. This we were not allowed to enjoy for long, as Joe yelled out, "Time to start." Great Scott! It seemed an age that we were on the go.

Mounting on deck, we found a dull morning breaking, and five of us in all got on board our boat, and, stepping the mast, we hoisted our leg-o'-mutton sail, a breeze having come up. We had hardly gotten off a half a mile from the schooner, when, ye powers of ill-luck! Just as I had feared all night, it began to drizzle, then rain, and subsequently it poured! Now, as we were in an open boat with no protection whatever, I leave it to the reader to imagine how happy we felt.

It was now about daylight, a dull, gray, rainy day. Oyster schooners without number off the shore, putting about, all sailing over the Government oyster beds. The sight was grand, notwithstanding the beastly weather. Our friend Joe said we had better go to a watch house further down the coast, some 3 or 4 miles away, there to wait until a possible chance for the rain to cease. As for photo work, I had little thought of it just then. All I wanted was a shelter from this terrible downpour. Useless to describe our sailing to the watch house. It was awfully wet, and that is all! It seemed hours before we could make that little hut which we now saw in the distance, and the necessary tacking rendered it simply maddening. On arriving there at last, we jumped ashore and ran up to this hospitable shelter.

This watch house was one of the many on this shore, placed there for the watchmen who guard the private oyster beds right in front of them. They are armed with large-bore repeating rifles, which carry a ball a long distance. Enterprising pirates come over these private grounds very often at night, and even venture to dredge in daylight, disguising their boats as much as possible. If within range the watchmen do not hesitate to fire upon them. Many men are often seriously injured, and not a few have been killed, but, as it would give away the fact that they had been pirating, the whole affair is hushed up, though

DODSON AND ROBSON.

Photo by J. Byron.

Flash-Light in Theater.

it is well known that men secretly go to the village doctors for treatment of serious wounds.

Our friend Joe knew the watchman at this particular house, hence we had a good welcome, and all their trials and adventures were soon recounted to us. It seemed days since we had started on this trip, and imagine our surprise when we learned it was only 7 A.M. So, breakfast being in order, we refreshed ourselves, keeping an eye on the fleet through the little window, regretting that the weather and light made it an impossibility to use the camera.

The few hours I spent in this dilapidated hut were some of the most exciting in my life. Every now and then a schooner would venture too far in shore, and begin dredging, or, in other words, stealing. Then the watchmen would rush out and fusilade the offenders. It was far from comfortable, as these people were not loath to reply with their own guns, and the fact of our being housed in this wooden affair was no protection at all. Then the possibility of these pirates making a landing and cleaning us out did not tend to make us joyful. However, I am glad to say we all escaped without injury.

I wished many a time that it would stop raining, as I was so anxious to get out among the fleet to photograph the *modus operandi* of dredging for oysters. So about 10 A.M. we thought we had better pull stumps, and we started off in a pelting shower, fitted out with some old oil clothing the watchmen loaned us, trying good naturedly to make the best of a bad time. But to my astonishment and great joy, when hardly a mile from shore, it ceased raining and the sun tried hard to pierce the clouds. Excellent, thought I, for photo work, and soon we were flying in among the fleet, Joe being nearly as anxious as I to obtain some pictures. So he very kindly placed himself entirely at my disposal, tiller in hand, and I secured quite a number of shots, though it was very hard work, standing up in the swaying boat, to handle the camera successfully. Still I made about twenty exposures, some of which turned out very fairly. I made one or two of how we all looked crouched in the stern of the boat, which are certainly curiosities, as we really looked like pirates ourselves, or tramps, more correctly speaking.

We kept sailing for an hour or so amid this wonderful fleet, and I regretted that I could not do it more justice photographically. The small pictures that my camera was turning out were far too small to show the wonderful sight of this enormous fleet at work. We inspected, alongside of one of the schooners, the oyster dredge, and how it worked, and were told of the terrible accidents that happen when the dredge catches at the bottom, as the men cannot let go of the handles, but must follow them ; for should they attempt it, a broken arm would certainly be the result. We ate some fine oysters, a basket of which were given us. Right from their bed to our mouths, they were excellent.

The weather was too threatening for us to linger, so we decided to turn homeward, as we were simply done up by our night of exposure and adventure. We sailed to the opening of that creek, and, of course, here our luck deserted us completely, so we were forced to take down our sails and row over. Think of rowing a heavy boat 6 miles! The only thing to do was to grit one's teeth and pull. Fortunately we were all possessed of the happy faculty of seeing the funny side of things, so we tried to joke our way along, though I can say it was no fun. The curious thing about this wonderful creek and its twenty odd reaches was that we would, for instance, pass a schooner at anchor, and then, getting a little further on, there right in front of us was the same identical schooner again which we seemed to pass and repass without ever getting beyond it. I hope I make myself quite plain without exciting doubts as to my sanity on that particular day!

At last, after a wearisome time of it, we came to the wharf, and it did not take long to bundle ashore and up to the inn, where, after civilizing ourselves and getting into our store clothes, we came down to a fine south Jersey dinner which awaited us. Then we felt better.

After a comfortable smoke around the old stove, we were ready for the late afternoon train. We thanked our good friend Joe for all his kindness; also our attentive host at the inn, and with the assurance we would repeat the trip some day, we made our adieus.

That night, very late, I called in at home, a dead-tired man, remarking I would not have missed the trip; but no gold could buy me to repeat it, and I thanked my lucky stars that I came away intact, as at one time I feared we would not.

It was some days before I could get over that night of exposure, and some little time before I had courage enough to enter my darkroom, and see what I had on my plates. These turned out only fairly well. Nothing else might have been expected. Still the few pictures I have of that trip fully convinced me that one night was sufficient for me with the Delaware oyster fleet, photographically, or even otherwise.

C. Emil Rönne.

BOHEMIA. Flash-Light in Theatre, by I. Byron.

COMMERCIAL PLATES IN ORTHOCHROMATIC PHOTOGRAPHY WITHOUT COLOR SCREENS.

"IF you did nothing else for the remainder of your days but advocate the use of orthochromatic plates to the exclusion of all others, your time would be well spent." This is what Mr. Edward Bierstadt said to me recently; a gentleman, by the way, who, through his researches and results on the subject, leads as an American authority.

So, then, we will begin at the beginning, and in the briefest possible way consider what is meant by orthochromatic plates, why they are not in more general use, who are the makers of such plates, and if there is any difference in their orthochromatic quality? All scientific terms will be avoided. Theories will not be considered, the subject being treated just as a professional would approach it to learn what advantage orthochromatic plates would be to him, and if there is any difference in the products of different makers.

In the first place we can consider the terms orthochromatic and isochromatic as interchangeable or synonymous, as applied to sensitive photographic plates. The one means the reproduction of colors correctly as to their brightness to the eye; the other implies the proper relative luminosity of colors on reproduction; or, in other words, the correct rendering, in a negative, of the varying degrees of brightness or luminosity in a subject, regardless of the colors it contains.

It is what wood-engravers have aimed to do, that is, to render in black and white, or monochrome, what they term the "tone values" of a painting, portrait or landscape. For this very reason the Century Company keep Timothy Cole, the distinguished American engraver, abroad, to engrave on wood before the paintings and frescoes of the masters, in order that he may record on his block the true orthochromatic reproduction of these masterpieces.

Photography can render correctly the light, shade and contour of a plaster cast, or reproduce a black and white drawing, but when the subject before the camera contains color (as almost everything does), then is there misrepresentation. We all know how the golden-haired, blue-eyed little child, or the auburn-haired miss has been libeled. How bright green foliage becomes black masses in a photograph. How the blue of the sky is bleached white, until the bright, fleecy clouds passing over it are indistinguishable; and it is needless to state that this is due to the darker colors, violet and blue, operating most powerfully on the photographic film, while the brighter colors, yellow, green, orange and red, are weakest in their action. As all objects contain these colors in a greater or less degree, it is not too strong a statement to make, that a correct representation is impossible through photography with ordinary plates.

I made a tour through all the photographic stock houses in New York recently, to purchase samples of all the orthochromatic plates in the American market. From the polite young clerks in these places, I learned that the particular brand of plates they sold were "the best made." When they were out of orthochromatics, I was told (but this in confidence) that all the dry plates of the best makers were now made orthochromatic. Here was a photographic millennium. If all dry plates were orthochromatic, there would be no need of advocating their use, no others being obtainable, so I purchased four boxes of plates other than orthochromatic, in the hope that this might, in some measure at least, be true.

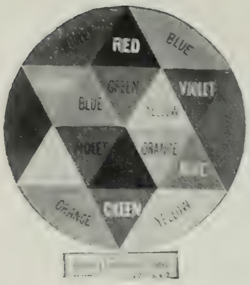
Now, to test the plates standard colors are necessary. The best I could obtain are those which Prang furnishes the schools. With Prang's standard yellow, orange, blue, green, orange red, and violet colored papers, a star 10 inches in diameter was designed. From this, negatives were made with each brand of plates. The light was that of an ordinary studio—the exposures were made in the middle of the day, as rapidly after each other as possible. An assistant developed the plates, and several trials of each plate were made to get the best time and development. The label on the end of each box of plates was photographed with the charts so that there would be no mistaking the negatives afterwards. Unfortunately, the half-tone cuts herewith do not show the gradations of tone in the original negatives. These gradations have been carefully recorded in the accompanying table, so that the results can be compared.

Table Showing the Orthochromatic Properties of Various Brands of Plates When Used Without Color Screens.

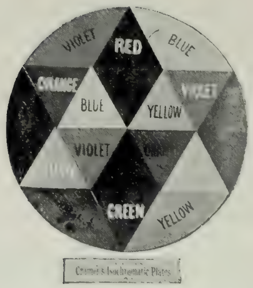
	1	2	3	4	5	6	
The Proper Color Values	Y	....	O	BG	R	V	
Cramer's Slow Isochromatic......	Y	....	O	B	G	RV	2 points incorrect.
Cramer's Medium Isochromatic ...	B	Y	....	V	GO	R	10 ‘‘ ‘‘
Forbes' Orthochromatic..........	B	Y	V	O	G	R	10 ‘‘ ‘‘
Carbutt's Orthochromatic.........	B	V	Y	O	G	R	12 ‘‘ ‘‘
Wuestner's Orthochromatic.......	B	V	Y	O	G	R	12 ‘‘ ‘‘
Lumière's Series B...	B	V	....	YO	GR	....	12 ‘‘ ‘‘
Eastman's Extra Rapid...........	B	V	....	YO	G	R	13 ‘‘ ‘‘
Cramer's Banner	B	....	V	Y	OG	R	13 ‘‘ ‘‘
Seed's Sens. 26...........	B	..	V	....	YOG	R	14 ‘‘ ‘‘
Hammer's Extra Fast	B	....	V	....	YOG	R	14 ‘‘ ‘‘

The first line in the table shows approximately the orthochromatic relations of these six standard colors, as they appear to the eye. The yellow, being the lightest, is designated as 1, and the violet, the darkest color, as 6. The orange is two shades darker than yellow, and is therefore numbered 3. Blue and green may be considered equally dark, and numbered 4, and red 5. So that an orthochromatic plate, to be correct, should, without a screen, show these standard colors in approximately the following order of brightness: Yellow, 1; orange, 3 blue and green, 4; red, 5, and violet, 6.

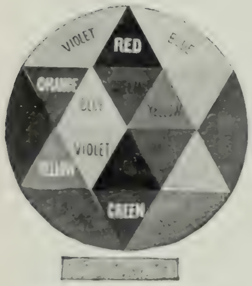
Now, a glance at the table will show what relation the colors bore to one another, when photographed on the various plates, in every case without a color screen. In the first place, it should be stated that the last four brands of plates are not sold as orthochromatic, and therefore should not be compared, except with each other. The Cramer "Banner" possesses the advantage in photographing the violet one



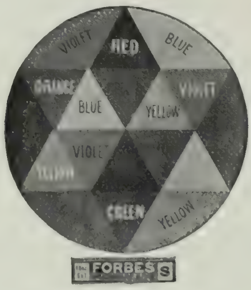
Cramer's Slow Isochromatic.



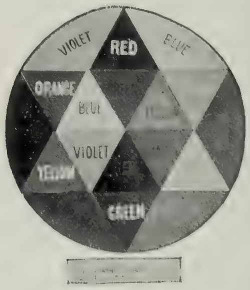
Cramer's Medium Isochromatic.



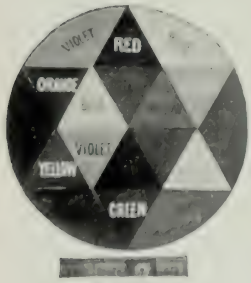
Carbutt's Orthochromatic.



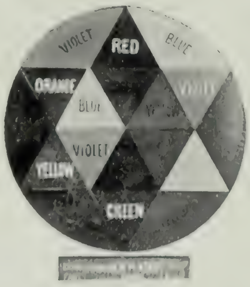
Forbes' Orthochromatic.



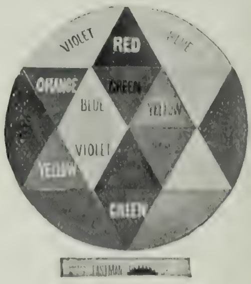
Wuestner's Orthochromatic.



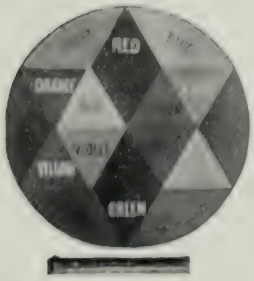
Seed E 26



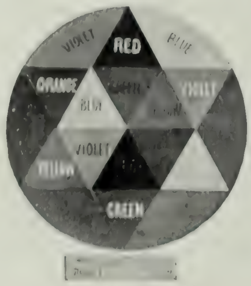
Hammer's Extra Fast



Eastman Plate.



Lumière's Series B



Cramer's "Banner."

shade darker than the Eastman, but this is offset by the Eastman recording the orange one shade brighter than the Cramer "Banner," so honors are equal. The Seed and Hammer plates are identical, and photograph the yellow so dark that they can be called non-orthochromatic.

Of the six makes of orthochromatic plates interesting differences in quality will be found. Cramer's slow isochromatic plate leads the others so far in orthochromatic properties, that, as was said in the first international yacht race, "there is no second." Still it must be noted that this plate is still two points incorrect. It photographs the green and red in each case one shade too dark ; this can be said in its favor, however—as well as in the favor of all the other plates—that Prang's standard green is too dark in color for a green. If this plate were a trifle more sensitive to the red, it would be a perfect orthochromatic plate for use without a color screen. The other orthochromatic plates all photograph blue as the lightest color. Cramer's medium isochromatic and Forbes' orthochromatic give yellow the second place. Cramer in this plate again puts violet back one shade nearer its proper position, while the Forbes photographs orange the lightest, which leaves both plates still ten points incorrect. Wuestner's and Carbutt's possess like properties ; violet, the darkest color, photographs lighter than yellow, the brightest, leaving these plates hardly deserving the title of orthochromatic. Lumière's series B, advertised as specially sensitive to red and yellow, is the next plate. It is the only one that photographs red at its proper value. In every other respect it is no better than the others.

From a study of the table, the value of orthochromatic or isochromatic plates can be readily seen. Speed was not considered here, because in photographing a painting, a costume rich in colors, or a landscape, that question is not as important as the proper rendition of color values.

If any additional interest is drawn to the value of orthochromatic properties in dry plates by this article, it will not have been in vain.

STEPHEN H. HORGAN.

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DR. PAUL ED. LIESEGANG.—With much regret we note the death of one of the practical workers in photography. Dr. Paul Ed. Liesegang, well known in the scientific world as an efficient writer on photographic topics, died at Düsseldorf, Germany, on the 6th of September, in the fifty-ninth year of his age. We lose in him a valued correspondent, whose contributions were always of a highly interesting character. To his relatives we extend our heartfelt sympathy.

* * *

THE mutascope is the name given to a projection apparatus by which animated photographs may be shown on the screen by the amateur worker at home. There is little doubt but that the exhibition of these pictures on such a scale will be popular. We would again point out to the management of the various instruments now on exhibition, the necessity for employing practical photographers in the making of the negatives and positives.

JOTTINGS FROM GERMANY.

Carbon Prints from Flat Negatives.—To obtain a rich black tone on carbon prints, made from flat negatives, the following manipulation is recommended: Immerse the print in a 1 per cent. solution of perchloride of iron until the film is completely saturated. After a slight washing, place it in a weak solution (1 : 200) of gallic acid. A strong intensification will be the result. If other iron salts are used instead of the perchloride of iron, and tannin or logwood instead of the gallic acid, any tone, from bluish red to bluish black, can be produced. For a greenish blue tone, sulphate of iron solution is first applied, followed by yellow prussiate of potash.

* * *

Grained Negatives.—These are obtained by adding to the ordinary emulsion sulphate of baryta and carbonate of lithia. The picture is then made without the lined screen, and developed as usual. The etching is the same as usual. The grain, being already in the emulsion, half-tone negatives from the view itself may be made direct.

* * *

Halation.—Belitzky recommends a coating of aurine collodion as a means of preventing halation. By mixing such collodion with castor oil, a backing having the same refractive index as glass is obtained. The collodion is composed as follows:

Plain collodion (3 per cent.)	100 cubic centimeters.
Alcohol	50 " "
Ether	50 " "
Castor oil	4 " "
Aurine	16-20 grams.

The proportion of castor oil must not be greater than that given above, or the coating will have a cloudy appearance when dry. The aurine dissolves easily in the collodion. Development may be carried on without removing the backing, though part of the latter will dissolve, without, however, having any bad effect. Before fixing, the back of the plate should be cleaned by wiping off the collodion.

* * *

Permanency of Platinum Prints.—It is asserted that, in spite of their permanency to light, platinum prints will change color in course of time. The cause of this cannot be fully explained, and we can only suppose that it is due to some of the iron salt that has not been removed from the print. Investigation has shown that every platinum print contains distinct traces of iron—more in the shadows than in the high lights—so that the iron can be looked on as helping to form the picture. All attempts to completely remove the iron from platinum prints have failed, no matter how much the prints have been washed.

* * *

Picric Acid.—This chemical has been recommended by Dr. Thierry, of Paris, as a curative for burns. All pain is said to cease as soon as the picric acid is applied. A saturated solution in water is used.

THE SPECTRUM SENSITIVENESS OF A SILVER SALT.

THE question which it is desired to discuss is why a sensitive salt is sensitive to more than merely monochromatic light. We have to come back to first principles before we can endeavor to answer the question at all. The principle—or perhaps we may call it the law—involved in the first place is that, where there is absorption of light by a body, there work of some kind must be performed. When we place a slab of bromide of silver in front of the slit of the spectroscope, or, what will do as well, if we examine a spectrum through such a slab, we find that the light that it absorbs corresponds with the photographic action that takes place on a bromide plate. Of course this may be taken as a reply to the question if we wish, but it is my wish to carry the matter a stage further back. It may be taken as axiomatic that when light acts on bromide of silver, Ag_2Br_2, one atom of bromine is thrown out of the molecule by the light itself, and the only way in which this can be done is by the waves of light increasing the swing of the atom as it vibrates in the molecule. It is usually considered that we must have well-timed blows to increase a swing of a body—that is, that they must be perpetually given at a fixed interval of time, such time being the time of the swing. But in the case of the atom of bromine which is swung out, we have an almost infinite number of waves of different periods which will affect it. Thus from the yellow to ultra-violet we have a whole octave of waves which affect the bromide of silver. It looks as if that what is usually accepted as a necessity is not so. The explanation, however, is not far to seek. It can only require a certain amplitude (the amplitude which is sufficient depending on circumstances external to the molecule, such as the avidity of a neighboring substance to attract the atom and to annex it) to cause it to swing beyond the sphere of molecular attraction, and, if this be attained, any further increase in motion is superfluous as far as that atom is concerned. The next point to consider is whether such an increase in motion or swing can be given by waves which are not absolutely in tune with the swing. A very simple physical experiment shows that such can be the case. Swing two pendulums side by side on the same knife edge; let one be a cord with a small weight attached, and the other a heavy weight with a rigid attachment. Let them, first of all, be of the same length. When the heavy weight is set in motion, the flexible pendulum will take up the motion and swing with it side by side, and as long as one swings, the other will swing. Let, however, the flexible pendulum be slightly shorter than the rigid pendulum, and the motion of the former will be increased at first, and then, after a long interval, die away, and again increase, and so on, this increase and diminution depending on the relative lengths of the two pendulums. When the swing of one is in the opposite direction to the swing of the other, the swing of the light pendulum will gradually diminish until it comes to rest, when it will commence to swing again with the heavy pendulum. Supposing the flexible pendulum to be an atom acted upon by a wave motion with which it is not absolutely in tune, it will increase the amplitude of swing at first, and, if the amplitude it takes is sufficient to take it out of the sphere of the attraction of the molecule, it will not matter that the two motions are not exactly of the same period. We eventually come to periods of vibration which are so different that the atom can never be ejected, and here we have no sensitiveness, as it is called. Absorption indicates the same thing in a visible manner, so absorption and sensitiveness go hand in hand. It seems to me that, broadly, this is a view that accounts for atomic motion answering to such a large part of the spectrum, as we know it does. This view may be enlarged in various directions to account for phenomena which I have called attention to in the last three years or so. The increase in sensitiveness in a higher temperature of the silver salt, the sluggishness of the response to feeble light, and also to very intense light, can be traced to this cause, and I propose shortly to give a theory based on what has just been indicated.

Captain Abney, in *The Photographic Journal.*

BRILLIANCY IN NEGATIVES.

IT is always desirable to be able to get brilliancy in our negatives, although we may not always want it, because flatness, thinness and lack of contrast are easy of attainment. Besides, if we do not know how to get brilliancy we cannot control the degree of softness, and he who is not to a considerable extent the master of his work can lay no claim to be either an artist or a scientific worker.

There is a common idea that, to get brilliancy, a short exposure and vigorous development are always efficient, but this is quite a mistake. If the subject has large contrasts, this procedure is to a certain extent successful, though generally at the expense of an under-exposed effect that is very objectionable. If the subject is flatly lighted, or lacking in contrast, then less exposure will lead to less density in the negative, and, by adding bromide to the developer, matters will be made still worse. Development can only go as far as exposure has prepared the way for it, and a reduced exposure and more restrained developer will give increased contrast only when a part of the subject has been bright enough to be well exposed, even in the shorter time. To get maximum brilliancy in negatives, all the light that falls upon the plate must be active in producing the image; stray and scattered light must be suppressed. Then, whatever the development is, provided only fog is avoided, the negative will be brilliant, or will be of such a character that it can easily be made brilliant, even if the exposure has been longer than necessary. How much the exposure may be increased must depend on the subject and the plate, but, under average conditions, with a properly coated plate, there is sufficient scope to allow for those errors of judgment from which no one can be free, unless he uses a reliable actinometer.

We have, from time to time, pointed out in these columns the more important sources of diffused or stray light in the camera, and seek now to emphasize a few of these that either are too much neglected or have become more important because of changes in apparatus. The light that falls upon the sides of the camera is a well-hackneyed subject in this connection, but it demands more consideration now that it is getting more common to use very wide-angle lenses on comparatively small plates. But whatever lens is used, its field is round, and the plate the image is received on is rectangular, so that there must, under the most advantageous adaptation of lens to plate, be a great deal of light that does not fall on the plate. The best way is to stop this light before it gets into the camera by the use of a lens shade. For ordinary cameras this may be merely a flat adjustable projection over the lens, but for studio work, and in hand cameras, it may be a diaphragm of rectangular aperture in front of the lens. In some portrait studios a long hood for the lens has been used, but this has not been properly efficient, because the opening at the further end has been round instead of a shape corresponding to the plate. We pointed out a few weeks ago the application of this principle of shading the lens to hand cameras. The important point is that light that is kept out of the camera is absolutely prevented from doing any mischief, while, if it passes within, the most that can be done is to reduce its influence.

But whatever is done in this direction the flood of light that forms the image falls upon the almost white surface of the plate, and is, of course, reflected from this in all directions, illuminating the whole of the interior of the camera, including the lens itself. The effect of the lens in sending back the part of this light that falls upon it is hardly under the control of the photographer, but the condition of the inside of the camera is. Where circumstances allow it, we much prefer to line the camera with black velvet, for there is no black paint or varnish that approaches this as a non-reflector. But in every case the best should be done to prevent reflection from any part of the inside of the camera, and attention should be paid to the front as well as to the sides. There is every reason to believe that, if more care were taken to reduce extraneous light, there would be less heard of the difficulty of getting brilliant negatives, and we commend the consideration of this matter especially to photo-mechanical workers.

A fruitful source of light in the wrong place is the difficulty of making one tube to move light-tight within another, when the lens used is in a sliding mount. The best of optical brass workers in London, and that means the best in the world, turn out mounts that are faulty in this respect, and it has become especially noticeable now that many lenses for hand cameras are provided with focusing jackets. If the tubes are bright, this defect will lead to the occasional appearance of a curved line on the negative, the center of the plate, or that part of it opposite the center of the lens being approximately the center of the curve. Whenever the lens mount proper slides in an outer tube, it is well to have a flange projecting over the annular space or contact surfaces at both ends of the mount. The optician can easily attach a projecting ring to the outer end of the inner tube, and any one can cut a kind of cardboard diaphragm and fix it on the inside of the front of the camera, that will not impede any light passing through the lens, but will stop, or, at least, divert and scatter light passing between the tubes.

Stray light admitted by other defects in the camera can easily be traced to its origin. A hole that is visible from the place occupied by the plate will give a second image that can generally be traced, although it is imposed upon the principal image. Both images will obviously be the same way up. If the false image is upside down, as compared with the other, it cannot be due to this cause, and the lens should be examined for its power of producing injurious reflections. But if there is a hole not visible from the plate, clearly the image it produces will fall upon the inside of the camera, illuminating it and adding to the general diffused light within. All this extraneous light from whatever source, affects the plate, and, therefore, makes it appear more sensitive than it really is. The value of a supplementary exposure has been recognized for a long time, but it is always dangerous, if only for the reason that one cannot tell how much exposure commercial plates have had in the factory. The various quantities of diffused light that different photographers allow, without, perhaps, knowing it, in their cameras may account for the fact that photographers vary in the ease with which they can secure clean negatives, some using much more bromide than others. It may be that some who adopt such precautions as we have mentioned will find a tendency to under-expose. This, however, is easily remedied, and the resulting negatives will then be markedly more brilliant. Whether the immediate result is advantageous or not, it must prove an ultimate benefit to have this matter of stray light more under control. The photographer's work will never be scientifically what it ought to be, nor, indeed, artistically successful, except by accident, until every affecting circumstance is recognized and made subservient to the end in view. CHAPMAN JONES, in *Photography*.

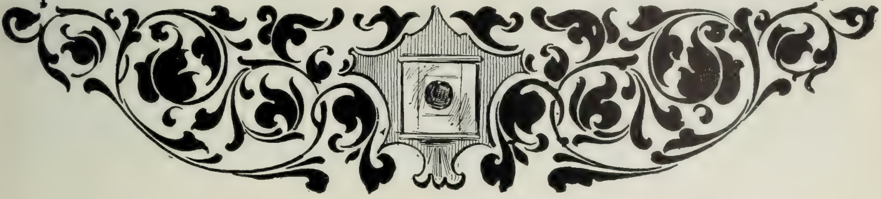
A VERY good ghost, writes J. A. Randall in *The Photographic News*, may be made to appear on a photographic plate by means of sulphate of quinine, and this method of deception has been largely used for the manufacture of spirit forms. The procedure is simple. First obtain a light background and paint upon it in outline, with sulphate of quinine, a shadowy and ghostlike figure, the more vague and impressionistic the better. Expose to bright sunshine for a short time, then place behind the subject in such a position that the ghost will appear floating about the figure in the negative. Of course, the painted image will be quite invisible to an observer, but will become visible on the sensitive plate.

* * *

NEVER, says E. Morton, place the principal object of interest exactly facing you and precisely in the center of your picture, especially when it happens to be of an architectural character. Avoid lines that may cut your picture in half or in sections. Do not let your light and dark form a pattern so obtrusive as to engage the attention to the exclusion of all else.

Photo by [illegible] Elliott

SOCIETIES



THE following societies will hold their annual meetings for election of officers on the dates mentioned:

Camera Club of the C. Bi. C.	October
Springfield Camera Club	October 21st
Sunnyside Camera Club	October 10th
American Lantern Slide Interchange	November 16th
Columbia Camera Club	November 11th
Buckeye Camera Club	December 17th
Cleveland Camera Club	December 20th
Colorado Camera Club Association	December 19th
St. Louis Photographic Society	December 8th

Secretaries of societies will greatly oblige by sending to us concise reports of meetings.

* * *

THE society season is open in real earnest. Secretaries would do well to read the paper by Thomas Bedding, printed in this issue of the BULLETIN, before their societies, and endeavor to create a real and active interest among the members.

* * *

THE bicycle, it is said, has played havoc with the photographic society. This should not be. Bicycle outings with the camera should be a feature this fall. Secretaries are not created simply to keep books and take minutes. They should be the life of the club, full of suggestions and full of energy. Only with such a secretary can a club retain enthusiasm. The California Camera Club is a good example to follow.

* * *

AMERICANS intending to exhibit at the Bristol (Eng.) International Photographic Exhibition, to be held December 14, 1896, to January 23, 1897, should note that applications must reach the Secretary, Mr. M. Lavington, 20 Berkeley square, Clifton, Bristol, Eng., not later than November 1st, and that all exhibits must be sent so as to reach Bristol not later than December 1st. We have a supply of entry blanks which we shall be pleased to mail to intending exhibitors.

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PHOTOGRAPHERS desirous of joining the photographic society of their town and not being familiar with the address of the secretary and other details should write us for information.

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THE Central Camera Club, of the Brooklyn Y. M. C. A., held their first competitive exhibition of prints on September 21st to 28th.

Process Work

THE OLDEST PHOTOGRAPHIC PORTRAIT.

A PORTRAIT of Cardinal d'Amboise, made in 1824 by Nicéphore Niépce, is said by Mr. T. Bolas to be in existence. It is a photogravure made likely by the bitumen process. It was in 1813 and 1816 that Niépce began to experiment with sensitive varnishes. These varnishes he spread upon lithographic stones and metal plates. His first attempts were to copy music written on paper, the latter made translucent by waxing. His cameras of 1816 he called "artificial eyes." One of them is now preserved in the museum of Châlons-sur-Saône. He first called his process "Heliographie," as he worked only in sunshine; but he soon found that light acted only as light, and he altered the name to "Photographie." This change of name was made in 1816. Before the end of 1817 he had experimented with various varnish materials, also yellow phosphorus and chloride of silver, as substances sensitive to light. Early in 1826 the Paris optician, Charles Chevalier, made an improved camera for Niépce, and afterwards introduced Niépce to Daguerre, but the latter took little or no interest in the production of printing surfaces. So that, when process-workers erect a monument to the first of their craft, the pedestal will bear the single name—Nicéphore Niépce.

LINE ETCHING ON ZINC.

In the articles by H. Jenkins on Process Engraving, continued in the *Inland Printer*, are found the following useful notes:

Sensitizing solution for line etching on ink:

Albumen from fresh egg	1 ounce.
Bichromate of ammonium	15 to 20 grains.
Water	8 ounces.

Dissolve the bichromate in the water, add to the albumen and beat up well with the albumen in a bowl or mortar. Filter until clean. Some etchers add a few drops of ammonia to the solution.

The strength of acid and time of etching cannot be stated arbitrarily. The experienced etcher does not, as a rule, measure his acid, and judges by appearance of the lines when the operation must cease. The beginner, however, may commence by using the following proportions for the solution and times for biting:

First bite	2½ parts acid to 32 parts water.	Etch two to three minutes.
Second bite	2½ parts acid to 32 parts water.	Etch five to six minutes.
Third bite	3½ parts acid to 32 parts water.	Etch eight to ten minutes.
Fourth bite	5 to 8 parts acid to 32 parts water.	Etch ten to twelve minutes.

THE INVENTOR OF HALF-TONE "ENAMEL."

It was asked in this department some time since, "Will not the inventor of the half-tone enamel process please step forward and receive his laurel wreath?" Mr. Ives thinks a man named Purton is entitled to it. He says: "The invention is not mine, but a modification of a French photogravure process, the formula for which was found in an old *Year Book*. The man who did most of the work of experimenting and developing the process was an Englishman named Purton. The use of fish glue was introduced some years after the method was started, the material at first employed being a mixture of albumen and gum arabic, with a little honey or glycerine to make the film hygroscopic, development being effected originally by dusting with a powdered tin salt, which prevented the formation of the hard enamel by heat on those parts where it adhered.

PROCESS NEGATIVES ON ORDINARY DRY PLATES.

First-class negatives, according to the *British Journal*, may be made on ordinary gelatino-bromide plates if they are soaked in a ½-grain-to-the-ounce solution of potassium bichromate, drained (not washed) and exposed wet.

FIRST NEWSPAPER CUTS IN AMERICA.

It is believed that the first use of illustrations in the reading matter of American newspapers occurred in the issue of the *Boston Gazette and County Journal* of March 12, 1770. An account of the killing of five of the earliest victims of the revolution—in the Boston riots—was adorned with cuts of the coffins in which they were buried.—*Newspaperdom.*

CLEARING ZINC PLATES AFTER ETCHING.

A writer in the *Process Photogram* says:

"In washing off the original resist from line engravings (and sometimes from zinc half-tones when the albumen method is used) the ink is difficult to get thoroughly cleaned out of this close work. A good plan is to heat the plates moderately, pour on it turps mixed with carbolic acid, about saturation. This will, with the help of the brush, dissolve out the stubborn parts much better than when turpentine alone or lye is used. A finish off with lye or monkey soap will give a nice, clean plate."

In this country the method of cleaning off the resist is much simpler and entirely effectual. The plate, covered with the acid resist, is heated until it begins to smoke, or until a drop of water let fall on it boils. It is then taken to the bottom of a sink with pincers and a saturated solution of lye poured over it. It is scrubbed with a scrubbing-brush until the resist is found to be entirely loosened, and then water is allowed to flow on it, when it is clean.

H. P. ROBINSON CALLS US PARASITES.

Process engravers got a whack by President H. P. Robinson, of the Photographic Convention of the United Kingdom. In his address he said : "It seems clear to me, for instance, that looking at our photographic art as a business, the many subsidiary inventions we so eagerly welcome are taking photography out of the hands of photographers and placing it in the hands of other trades. Take what is now the chief of these parasites, that which is called 'process'; what has that to do with photography? It is a printing and engraving business that gets all it can out of photography. It is the cuckoo in the hedge-sparrow's nest that is quickly elbowing the genuine bird out of its own cradle. The promoters of 'process' have much to answer for to the photographer."

Process engravers readily acknowledge the debt they owe photography, but, on the other hand, photographers must admit that half-tone has popularized and recorded in permanent printing ink a mass of their work that would otherwise never have been seen. Many of Mr. Robinson's own excellent studies would never have exercised the art influence they have, were it not for the process parasites who have reproduced his work in the form of imperishable engravings.

FACTS WORTH KNOWING.

Photo engravers should know that a copyright is of no value on an engraving used for advertising purposes. In such cases a design patent is necessary and can be secured from the Patent Office. The fee for three years and six months is $10 ; seven years, $15, and fourteen years, $30.

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Few photo-engravers have likely ever thought of the possibility of hastening the action of the chloride of iron solution by heating it when etching copper. Those who have worked with ink as an acid resist know how necessary it is to keep the mordant cool. But with the enamel as a resist, the mordant can be heated to at least 100 degrees Fahr. without injury to the resist.

Many half-tone negatives are injured by small pieces of dirt striking their delicate films while washing under the tap. A practical plan is to have pieces of flannel, say 12 inches square. Tie one of these around the tap, so that when the water is turned on it will make a bag of filtering water. Change the flannel every second day, and it will be seen how much grit, iron rust and sand has been kept from puncturing transparent holes in the negatives.

* * *

Three-color process cameras are the subjects of English patents, F. E. Ives, of Philadelphia, and B. J. Edwards, of Middlesex, England. being the inventors. The latter's patent was applied for on February 19, 1895, while Mr. Ives made his application only two days later. Both cameras are intended to make the triple negatives at the same time with a single lens, the color screens in both cases being immediately in front of the sensitive plates.

REPRESENTATIVE AMERICAN ENGRAVERS.

The ninth volume of "The International Annual," now in press, will contain some one hundred studies in process work, by such firms as Franklin Engraving and Electrotyping Company, Binner Engraving Company, The Albany Engraving Company, The Blanchard & Watts Engraving Company, Kilburn & Cross, Van Ness & Littlejohn, Electro-Light Engraving Company, The Baltimore Engraving Company, William C. Gage & Sons, Photochrome Engraving Company, The Photo-Engraving Company, Sanders Engraving Company, George H. Benedict & Company, R. J. McFee & Company, Boston Engraving & McIndoe Printing Company, Grand Rapids Engraving Company, Western Photo-Engraving Company, Teachenor & Bartberger Engraving Company, Philadelphia Photo-Engraving Company, Hagopian Photo-Engraving Company, Bramblett & Beygeh, Weeks Engraving Company, St. Louis Photo-Engraving Company, American Process Engraving Company, and the Suffolk Engraving Company.

BUSINESS NOTES.

"Typographic Illustrator" is what Mr. Samuel R. Mason terms himself on starting a photo-engraving business in Cleveland, O.

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Here is an English advertisement: "Don't be afraid to use our 3-color process. In consequence of various warnings and rumors in circulation, printers and others are hereby assured that no patent rights are infringed by photo-chromo blocks, and there is absolutely no legal hindrance whatever in regard to their use. All the original colors of any picture, object or material are closely reproduced in three workings only (yellow, red and blue). The charge for these blocks is 4/ per sq. inch. Minimum set, £3 4s. (16 sq. inches or less). Ensure clearness of detail and accuracy of coloring in a far greater degree than are obtained by any other three-color block process."

At the annual dinner given by Carl Hentschel & Co., of London, to their employees, Mr. Hentschel, in speaking of the growth of the photo-engraving business, said that last year their employees numbered seventy-five, while this year there were present over one hundred and thirty.

* * *

Photo-decorated titles are the latest English novelty. These are a substitute for the ordinary pictured tile, with its usually rather meaningless subject. These tiles, 6 inches square (either white or cream), are ornamented with real photographs, printed in some one of several stock colors, and fired under the glaze, thus making them practically imperishable for all ordinary decorative purposes.

DRY PLATES USED IN PHOTO-MECHANICAL WORK.

The plates which are used with a screen in the various reproduction processes are not exactly the same as the ordinary dry plates. They are prepared with an unripe gelatino-bromide of silver emulsion, so as to furnish the glass-clear shadows necessary for this purpose. But they are for that reason also less sensitive than the others. The glass-clear shadows are the cause of defects which will occur sometimes.

Red Silver Fog.—There are two kinds of fog, which can be removed with bromide of copper and fixing soda, or with Farmer's reducer, consisting, therefore, of metallic silver. One kind is formed of black silver, the other kind of red silver.

The black fog, in which the fog has the same appearance as the picture, occurs by incorrect exposure, over-development, or when the emulsion has been ripened too much.

The highly sensitive plates generally have this defect. Plates prepared for photo-mechanical purposes, and correctly exposed and developed, do not have it.

While the black fog always originates from reduced bromide of silver, the red silver fog occurs only on the reduction of a soluble silver salt. For instance, when the emulsion was not completely liberated from the nitrate of silver in excess, or the presence of too much ammonia in the developer, or if a little fixing soda was added to the same, or if the plate was insufficiently washed between developing and fixing—in all these cases we have to treat with soluble silver salts, which as in the printing-out papers, can be reduced to red metal.

A weak black fog can protect the plate from the red fog. On the ordinary dry plate the latter is observed very seldom. The reason for this may be that the bromide of silver will not dissolve so easily underneath the thin silver film as when lying on the open surface. On the other hand, it is possible that the forming silver passes into the black state, if black silver was already present at the place in question.

On plates prepared with unripe emulsion the red fog will therefore appear much easier than with the ordinary ones. The fact that, with screen pictures, unexposed lines will sometimes run over the whole plate, facilitates still more its formation.

For half-tone negatives, fixing soda, as accelerator, should never be put into the developer, and the latter should not be composed of pyro and ammonia. A thorough washing is necessary between developing and fixing, and as little as possible of the developing substances should come in contact with the fixing bath, particularly if amidol is used. An addition of bromide of potassium to the developer will have a charming effect. The designation "metallic red fog" might lead to mistakes. A few words about the appearance may therefore not be out of place:

Immediately after exposure—therefore in wet condition—the unexposed parts have a faint yellow coloration. Later on they will change to a dark red. Formerly I was of the opinion that the light was the cause of it by reason of the decomposition of the bromide of silver, which can never be completely removed by fixing, but in fact it is only a consequence of the drying of the film. If the dried negative is moistened again later on, it will become light yellow again, the same as before.

This red fog can be removed by a short treatment with bromide of copper and the fixing bath, or with Farmer's reducer. It is sometimes sufficient to leave the plate for several hours in the fixing bath. The bromide of silver remaining underneath the film will then also dissolve.

Mercury Intensifier.—The intensification takes place after bleaching with bichloride of mercury and the treatment with ammonia, in the

Photo by J. BYRON. A LIVING POSTER.

ordinary way. Strange to say, it is here also not easy at first to keep the high lights completely clear. After washing, the usual time after bleaching—about an hour—a white cloudiness will appear in the film. The same is only at the places which should be glass-clear, not at the dark ones. It is mercury amide, which formed by the action of ammonia upon some bichloride of mercury which remained. Rubbing with the finger is sometimes sufficient to remove the same. If it is in the film, however, nothing is known by which it can be removed.

R. Ed. Liesegang.
Translated by
Henry Dietrich.

DARKROOM ILLUMINATION.

"When we come to consider the colors of non-actinic glass as used for darkroom illumination, it is necessary to remember that there are two distinct methods of imparting color to glass, viz., either by adding the coloring principle to the molten mass, as in pot-metal, or by merely giving a superficial coating, as in flashed glass. The two varieties are at once distinguishable on looking edgeways through a small piece of colored glass. Ruby glass is always flashed, for otherwise the color would be so deep as to be almost opaque. Cuprous oxide is the usual coloring matter employed for ruby glass for photographic use, but gold-purple also produces a ruby tint. The absorptive power of commercial ruby glass varies so considerably that no sample, however deep the color, should be considered safe without either a spectroscopic examination or a preliminary trial with a partly shaded sensitive film. The spectrum of ruby glass should show no trace of green, but some specimens are so inferior that even blue rays are freely transmitted. This is notably the case with ruby glass colored with gold-purple. Green glass is generally pot-metal, and the color is imparted by a mixture of cuprous and ferrous sulphates. In these days of color-sensitive films, it is difficult to say what is absolutely safe; but, if a combination of ruby copper glass with either cobalt or green be used, as recommended by Abney, there will be very little danger of fogging, even with the most sensitive films."—J. Vincent Elsden in *British Journal of Photography.*

◆

Count Turati recommends glazing as a means of improving the shadows in matt-surface prints. The print is coated with bichromated gum, again exposed in the printing frame under the negative, and then washed in tepid water. The shadows retain the gum rendered insoluble by exposure to light, and their depth and transparency are considerably enhanced. As a means of further increasing the effect, a slight addition of coloring matter may be added to the gum solution.

◆

Professor D. L. Elmendorf has returned from a trip through the West Indies and Mexico, and has brought back several hundred exposed plates from which lantern slides will be made. The tele-photo lens was extensively used and did yeoman service.

Our Reviewer.
School of Practical Process Engraving.

Early Work in Photography, by W. Ethelbert Henry, is a novel publication, in which the author departs from old customs and gives us as a result a thoroughly practical work for the beginner. The instructions commence with the printing and pass on through darkroom work to the use of, and details regarding, the various parts of the outfit, winding up with many useful formulas. A standard negative and transparency is included in each copy, a novel feature that will find favor. Price, 50 cents.

MARTIN G. GOOD has bought the entire stock of photographic materials from the Treleaven Optical Co., and will continue in the same business with a full line of supplies.

A BOOKLET advertising Pepper's linoleum has reached us. The six half-tone reproductions in color are illustrative of the growing application of three-color work to every class of trade. The booklet is a distinct success, a credit to the printers who did the work, and to the linoleum manufacturers, whose enterprise will, doubtless, be rewarded.

THE *Weekly Press* of Christchurch, New Zealand, is an excellent paper, and is illustrated in a manner that reminds us of our Buffalo *Express*. The many half-tones are carefully printed, and the whole paper shows the presence of a master-head and a master-hand.

THE Harper Illustrating Syndicate, of Columbus, O., is an enterprising concern, furnishing cuts for newspapers and magazines, and having a line of stock cuts that are more attractive than the usual things in this line. Many campaign cuts are shown in their prospectus, and all are well conceived and will meet with approval.

STEIN, the famous photographer, has disposed of his Chicago studio, 1301 Michigan avenue, to Miss Beatrice Tonnesen, who will carry on the business as heretofore.

"IN all America no other photographic publication has credit for so large a circulation as is accorded to Anthony's Photographic BULLETIN, published monthly at New York, and the publishers of the 'American Newspaper Directory' will guarantee the accuracy of the circulation rating accorded to this paper by a reward of $100 payable to the first person who successfully assails it."—From *Printers' Ink*, May 6, 1896.

FROM London we receive the first yearbook devoted to the optical lantern. It is entitled *The Magic Lantern Journal and Photographic Enlarger Almanac and Annual*, 1896-97, and is edited by J. Hay Taylor. The illustrations are, unfortunately, hackneyed ones, most of which have done considerable service in the past in other publications. The many original and practical articles on lantern matters will interest the makers of slides, and the book will, doubtless, find a ready sale.

MESSRS. PERCY LUND & COMPANY have removed their London quarters to 3 Amen Corner, Paternoster Row. The great increase in their printing and publishing departments has resulted in the closing out of their photographic supply branch. The firm will in future be known as

Percy Lund, Humphries & Co., Limited. "The International Annual" will, as heretofore, be published by them.

"The International Annual and American Process Year Book" for 1897 is now well on the way to completion, and promises to far eclipse any of its predecessors. No expense or time has been spared in its production, and the result is a standard volume filled with practical suggestions, and copiously illustrated by the best amateur and professional photographers in this and other countries. An actual photograph forms the frontispiece, and is interesting for several reasons. First, it is a splendid portrait study; a study in lighting from which much valuable information may be gathered. Secondly, it is not retouched, the negative having been made through a Strauss stipple plate. This splits up all the defects, rendering them invisible to the eye. Thirdly, the print is on Aristo-Platino paper, toned first with gold and then with platinum, and represents the highest achievement in the line of printing-out papers. A three-color print will interest all who have watched in the Bulletin the improvement in this branch of photo-reproduction. Some one hundred photo-engravings by the leading photo-engravers of America will be an interesting feature, showing to what a state of perfection this art has been brought in this country. Of the articles it may be said that all convey useful and practical information, and almost every branch of photography is touched upon. An unusually complete set of revised and useful formulas and tables, and a revised list of home and foreign photographic societies form a useful appendix. The whole book is printed on wood-cut paper, is strongly bound and is of such a character as to render it well worthy of a place in the library of every student of photography.

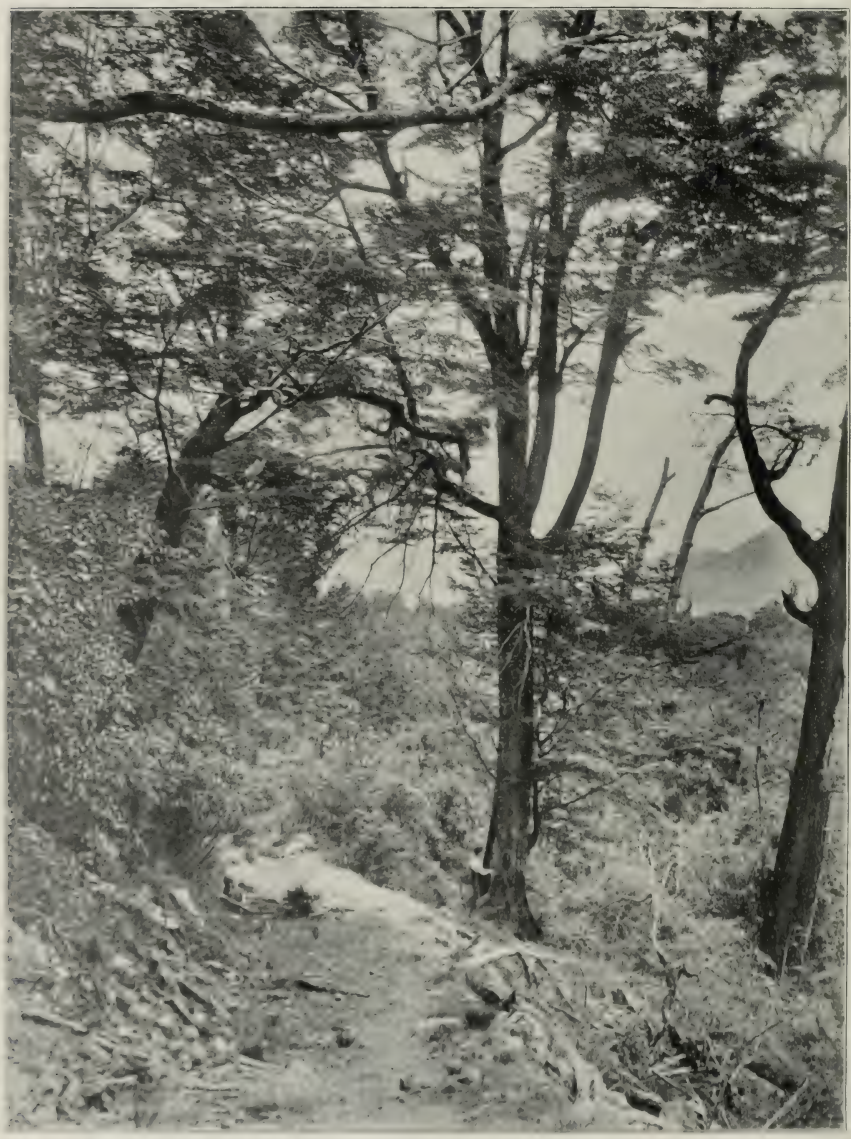
An undoubted novelty in the line of backgrounds and background carriers is the *King Bell Background Carrier*, in which an endless background is employed. This is extremely serviceable for busts and three-quarter-length portraits, and has the particular advantage of giving an almost endless variety of backgrounds from the one endless roll. Indeed, not only can every inch of the roll be in turn utilized, but, if so desired, the carrier can be turned around and the inverted designs employed. The manipulation is exceedingly simple. A cut of the carrier is shown in the advertising columns.

We have succeeded in obtaining a few copies of the April issue of the Bulletin, and these can be purchased at the regular price of 25 cents by those desiring to complete their files.

The Quad camera, with its undetachable quadruplex plate-holder, is an exceedingly popular box, and the results obtainable with it leave nothing to be desired. For those whose hobby is lantern-slide making, it is particularly suitable, the size of the negatives, 3½ x 3½ inches, permitting of the making of slides by contact.

Our frontispiece is a particularly fine specimen of three-color work, and will, we think, find favor with our readers. We have, during the past year or so, endeavored to present samples of this class of work, with the idea of showing what progress was being made in three-color printing and of assisting in a small way in the perfection of this most useful of the methods of photo-reproduction. The vase shown in this issue is a very good example of the present state of this process, and is the work of the Boston Engraving and McIndoe Printing Co., of 113 Purchase street, Boston, Mass. This concern has probably the best equipped establishment in New England, and, in addition to three-color half-tone work, zinc and copper line plates, zinc and copper half-tone plates, grain-color plates and embossing dies are turned out in such quantity and of such quality as to make a day and night force necessary.

"Portraits in Pastel on Solar Enlargements." Published by E. Long & Son. Price, $1. This is a book that will be valued by those engaged in the making of solar enlargements who are desirous of adding pastel work to their regular output. Preparation for work, colors, tools and paper are described, and the treatment of the hair, background, drapery and full-length figures is entered into in a practical and simple manner.



BUSH SCENE, OTARAMA, NEW ZEALAND.

Photograph by I. N. Taylor.

ANTHONY'S

Photographic Bulletin.

EDITORS:

PROF. CHARLES F. CHANDLER, PH.D., LL.D.
FREDERICK J. HARRISON.

VOL. XXVII. NOVEMBER, 1896. No. 11.

CLOUDS IN LANDSCAPES.

THE artistic effect of landscape pictures suffers considerably from the absence of clouds or a natural-looking sky. At recent exhibitions visited by us, we have noted that in nearly every case the sky of the picture was represented by a white space, which entirely robbed the picture of any claim to a true representation of the subject photographed or anything more than a poor attempt at the production of the artistic. It is unnecessary to say that a purely white sky is never present. There is either a blue expanse above our heads or the sky is dotted with clouds, or, should it be entirely overcast, there is sufficient light and shade to give relief from the monotony of the white sheet. In no case, whatever, is there an absolutely white sky. Therefore, in every case where such a clear sheet of paper is set up as representative of the sky, the photographer has erred and has put his error on record.

The sky usually gives off more light than the rest of the picture, and this light is so intense that, in time exposures, that part of the plate on which the sky is impressed is so far over-exposed as to be absolutely lost on development. The sky appears first, and, by the time that the detail in the shadows of the landscape is brought out, all trace of clouds is lost, and an opaque space, printing perfectly white, is the result. With the ordinary plate, without dodging in development, it is impossible to obtain on one plate a landscape picture which shall give detail in the shadows of the landscape and at the same time give a sky approximating in color value that of the original subject. It is similar to attempting to make a picture of an electric-arc light and a candle flame at one exposure and expecting to get both perfect in one development. A rapid exposure will give the clouds, but detail in the shadows is found wanting. A time exposure will give detail in the

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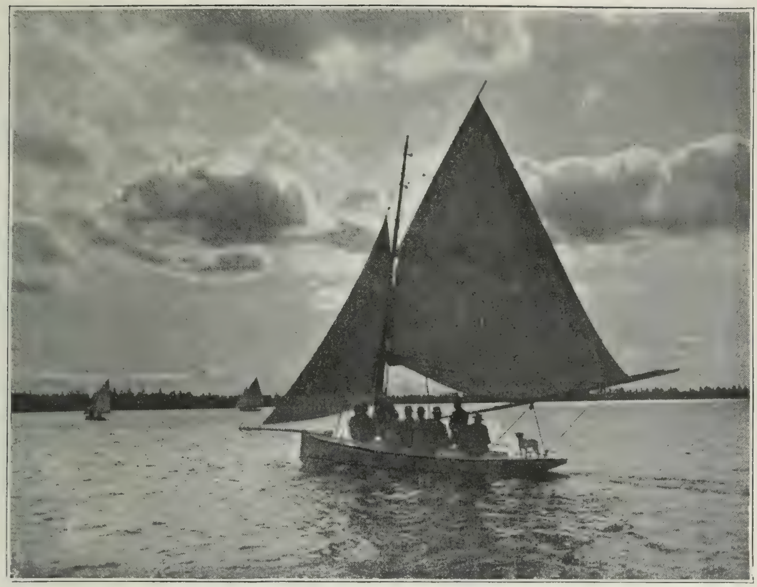
shadows, but the sky is lost. Special forms of diaphragms and shutters have been devised, having for their object the giving of longer exposures to landscapes and short exposures to skies. These have not proved to be particularly beneficial in their effects and have not found any wide application. Suggestions have been offered as to the best method of removing the cap, it being suggested that the cap be first loosened at the bottom and raised slowly with an upward movement from the bottom, so that the cap is, as it were, hinged to the top of the hood of the lens. This is not a satisfactory method, for circumstances alter cases. The only absolutely reliable method would be in the use of a perfect orthochromatic plate; this not being at hand, the nearest approximation may be obtained by the use of an orthochromatic plate in conjunction with a color screen. With this combination, surprisingly perfect results can be obtained.

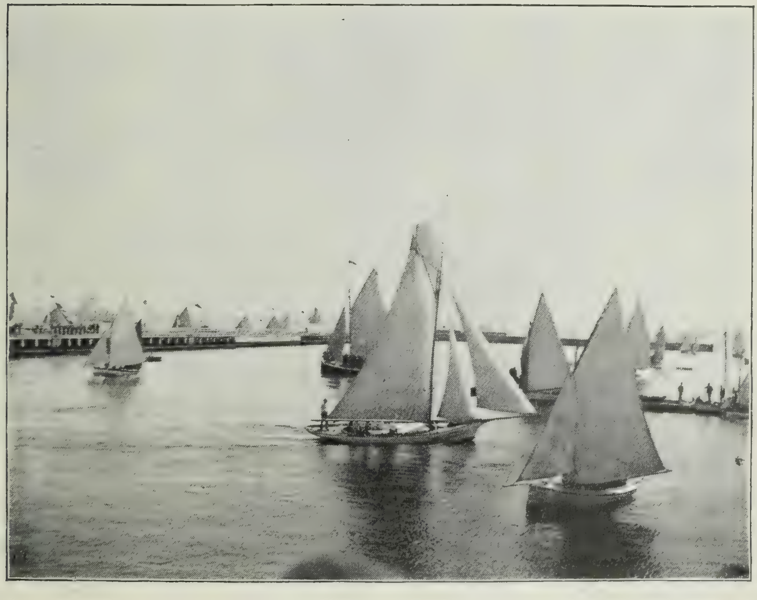
In the case of ordinary plates, when it is particularly desired to preserve the clouds present in the original subject, two exposures should be made, one rapidly following the other, one being a time exposure and the other an instantaneous one. The first is developed for the landscape and the second for the clouds, the former one being used for printing the lower part of the picture, and the latter for the printing of the sky. In this way, by carefully registering the two negatives on the print, extremely fine results are readily obtainable.

The use of separate cloud negatives has of late not met with much favor, and it would seem that these are subterfuges that can hardly call for commendation. The only sky that is properly suited to the subject is that which is in evidence at the time the photograph was taken. The subtle lights and shadows were produced by the particular sky at that particular moment, and the use of any sky other than the one then in evidence will result in the production of a picture that is incorrect. The extreme of this wrong use of separate cloud negatives is found when a subject lit from the right hand is used in conjunction with clouds lit from the left hand. In all cases where a foreign sky has been called into requisition, there must be inaccuracy.

One or other of the above-described methods should be adopted—that is, either two negatives should be made, one immediately after the other, or an orthochromatic plate and color-screen should be employed.

There is a method by which one plate may be made to give a close approximation to the sky present in the original subject, and that is by restraining the sky by the aid of potassium bromide. The plate is placed in the developer, and, as soon as the sky makes its appearance, the tray is tilted so that the developer will cover the bottom part of the plate, and the upper portion or sky is lightly brushed over with a weak solution of potassium bromide, the plate being repeatedly flooded with the developer so that no line of demarcation shall be apparent. In this way the sky can be held back considerably, while the balance of the picture is being brought out. The precaution to be taken is to see that the sky is not made too thin, an effect as bad in one direction as the white sky in the other.





Photographs by H. Crisp.

COMPARATIVE PICTURES SHOWING VALUE OF CLOUDS.

For the artificial blocking in of skies on the back of the negatives two or three methods have been recommended. The glass side of the plate may be covered with ground-glass varnish and clouds worked in with a stump charged with powdered graphite. This requires extreme care, but in the hands of careful workers fairly good results may be obtained. Another method is to paint on the glass side of the negative with a stiff brush dipped in some non-actinic color, the edges of the color being softened down with a softer brush. Should the color give too sharp an appearance to the clouds, the painting should be done on a separate piece of glass, and thus separated still further from the negative, producing then a more vignetted appearance.

Another method which has met with some approval, but which we can hardly recommend, is to remove the print from the printing-frame and lay it under a sheet of clear glass, placing on the glass some pieces of cotton-wool and on this another sheet of glass. The landscape is covered up with a handkerchief or duster and the whole exposed to light, the duster being moved backwards and forwards so that no sharp line shall be shown. In this method, care must be taken that the clouds do not interfere with any tall buildings or trees.

Items of Interest

"THE International Annual" is now in the hands of the photographic public, and will, we venture to think, find favor. In the matter of illustrations we believe it more than fulfills all expectations, and the many world-famous authorities who contribute the reading matter are a sufficient assurance of the excellence of the general text. The formulas at the end of the book are an especial feature. In addition to the manufacturers' formulas, there will be found working instructions for the blue print process, for making black lines on a white ground, the Kallitype process, coloring photographs, silvering mirrors and hundreds of hints and suggestions of much value.

* * *

ILLUSTRATIONS such as those in the ninth volume of "The International Annual" teach many lessons. Hints as to posing and lighting, grouping, selection of point of view, and other salient points in the making of truly artistic work, may be gathered from the examples kindly donated by really representative workers.

* * *

SHOULD certain portions only of a negative be too dense, local reduction must be resorted to. This is most successfully accomplished by thoroughly soaking the plate in water and with a camel's hair brush applying to the overdense parts a mixture of hypo solution and potassium ferricyanide. The particular strength of this solution is immaterial. The reduction should be done near running water, and the plate well rinsed immediately following each application of the reducing solution.

◆

The parastudio is the name given to an umbrella supported on a stand, and designed for use in making portraits and groups out-of-doors. The umbrella is capable of being placed in any position, and a side screen is also provided. A good head screen with side shade answers just as well.

◆

As bearing on the keeping power of sensitive plates, we would record that we recently had occasion to test some cut films, made twenty-four months ago. The films had lost none of their former rapidity, were fogged around the edges for one quarter of an inch, but were perfectly good in other respects.

◆

Herr Andrée did not take his contemplated balloon trip to the North Pole. A very complete photographic outfit formed an important part of the equipment of the expedition. The whole equipment has been left at Spitzbergen, and a start is to be made in July next.

◆

Black surface markings on bromide prints are, writes Dr. Leo Backelandt, chiefly found on glossy or enameled papers, occurring but seldom on matt or rough-surface papers. They do not show in undeveloped prints, appearing during development. The cause of these markings, there is every reason to believe, is pressure or friction on the sensitive film, and is dependent, to a certain degree, on electrical conditions. These markings may be removed by brushing with potassium cyanide solution, by rubbing with a piece of cotton dipped in dilute ammonia, or, best of all, by rubbing the dry surface with a tuft of cotton dipped in alcohol.

◆

J. W. Bennetto, of Newquay, England, claims to have discovered a method of photography in natural colors, but up to the present moment has declined to give any particulars regarding his method, and has failed to exhibit any passable results. We learn that on August 31st Mr. Bennetto, being blindfolded, made an exposure on a colored chart, prepared by a committee of four citizens, and showed a transparency on glass as a result. "The exposure had been made in perfect ignorance of the subject, and the focus was not correct. Under these circumstances we consider that the result represented the colors of the picture sufficiently to prove that Mr. Bennetto can produce colors by photography in a transparency on glass." So runs the committee's report. They fail, however, to say why the operator was blindfolded, why he did not focus on a dummy design first, and, in fact, the whole matter has arrived at a stage where Mr. Bennetto must, for his own credit, give further particulars.

◆

F. M. Sutcliffe, in *Photography*, makes the following astounding statement: "Until a photographer learns that, of two negatives, the least perfect, technically, may be the one worth printing from, even if covered with pinholes and showing signs of movement of the sitter, while the other may be faultlessly clean and show no signs of movement, he is not fit to be called a photographer." Such a sentence spoils the effect of an otherwise excellent article. A negative covered with pinholes and showing signs of movement of the sitter should in all cases be consigned to the barrel for waste. Nothing can justify printing from it.

◆

In the eighth volume of "The International Annual," Manly Miles called attention to the fact that rapid alternations of black and white, when impressed upon the eye, produce color sensations. General interest in the photographing of colors and in all pertaining to the subject being now at a high pitch, the method of producing colors from black and white will probably be of interest. Two discs, from 4 to 6 inches in diameter, one black and the other white, are made, and a hole cut out of the center of each, so as to fit on a peg, forming the produced axis of a whirling table or a spinning top. A series of concentric circles are then drawn on the white disc, by the aid of compasses, from a center that is approximately $\frac{1}{20}$ to $\frac{1}{10}$ of an inch from the center of revolution. These lines may be from $\frac{1}{3}$ to $\frac{1}{2}$ an inch apart. A radial slit is then made from the circumference to hole in the middle of each disc, so that they may be interlocked and placed on the whirling table together, and the relative proportions of black and white in the combined disc easily adjusted. When properly adjusted and made to rotate, bright lines and bands of color appear, their color and intensity varying with the proportion of black and white of the discs, with the character of the light, the speed of rotation, and the thickness of the lines in relation to the spaces between them.

* * *

IT is a very bad plan to spoil an otherwise good picture by introducing an inharmonious figure—even though something is needed to balance the picture. Better use a pile of stones, a log, or some hay. If figures be used, the wonderful power of the human figure for attracting attention must be borne in mind.

* * *

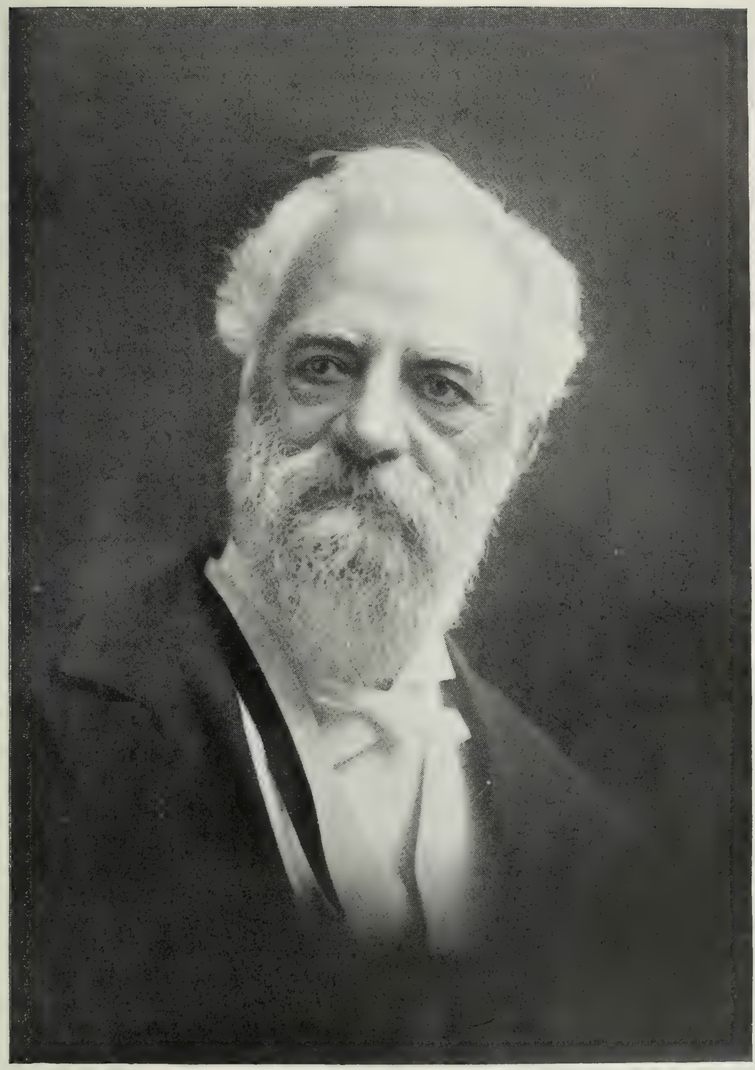
A. C. CHAMPAGNE gives the following advice for packing undeveloped plates: First lay the plates face to face, gelatine side inwards, with no cardboard between, and bind tightly each pair with a piece of black needle paper, putting them all in an empty dry-plate box, held closed by elastic bands. Before placing the plates face to face, it is necessary to brush and clean them carefully.

* * *

J. C. HAGEDORN advises professional photographers to make their galleries as inviting to the public as possible, to keep them neat and clean, and to keep them cool in summer and warm in winter, so that the ladies and children may be made comfortable. Care should be taken to display pictures to the best advantage, making them ornaments to the gallery. They should not be crowded up on one side of the room, nor mixed up too much in regard to size, style and position. The comfort and pleasure of the customer should always be kept in view.

* * *

REFERRING to the excellent article by Mr. Stephen H. Horgan, which appeared in the October issue of the BULLETIN, and which embodied a comparison of the various dry plates on the market as regards their orthochromatic qualities when used without color screens, an article, by the way, which was entirely free from any attempt at advertising and was an absolutely impartial statement made to encourage orthochromatic photography generally and to set down information for reference, we note the following remarks in the *St. Louis and Canadian Photographer:* "In the first place, before an article of such importance in its results can be published we should certainly be assured of the competency and reliability of the author, and, while we do not wish to depreciate his claims to either one or the other, he is personally unknown to us, and we must decline to insert the article, as it certainly does not agree with our own experiments in the same direction. In making a scientific test, such as this, it is not justice to the various dry plate makers to expose all the plates the same time or develop them with the same formula of developer. Each make of plate has its peculiarities known to the maker, who gives the formula by which the best results may be brought out, and it may be the formula used was one that would not do justice to some, while it was the best for others. At any rate, we have obtained very different results on some of the plates named than this chart shows,



STUDY IN LIGHTING.

Photograph by Van Loo & Trost.
Engraved by Weeks Engraving Co.,
Philadelphia, Pa.

when using the developer according to the maker's formula. Therefore, we say the publication of this chart and the article would be apt to both mislead the photographer and do an injustice to several of the dry plate makers. We make this explanation because the author informs us that at least two other journals have accepted it."

In the article alluded to, nothing is said with reference to the exact times of exposure, and we are aware that varying exposures were given to the plates tested, and that in some cases as many as seven plates were exposed, so that the one selected might be truly representative of the best of which the plate was capable. Nowhere in the article is it mentioned that all the plates had the same time of exposure, and any one having a knowledge of the subject would never come to such a conclusion, considering that of all the plates tested there were plates of such varying rapidities as Seed's 26, and Cramer's slow isochromatic. Still more peculiar is the assertion that all the plates were developed in the same developer. Nowhere in the article is such a statement made, and such a statement is, of course, ridiculous. There is, however, a sentence on page 339, which the writer of the above comment would have read, if the article had received his careful attention. The sentence is, "An assistant developed the plates, and several trials of each plate were made to get the best time and development." This, as will be seen, indicates that varying times of exposure and various developers and methods of development were employed in arriving at the results shown. As regards the claims of Mr. Horgan to be considered competent and reliable to undertake such work as this, the fact that he is unknown to the *St. Louis and Canadian Photographer* does not stamp him as by any means an obscure writer, but is a rather serious reflection upon the writer of the article quoted above, for Mr. Horgan has been a continuous contributor to Anthony's Photographic BULLETIN for the past two years, and the BULLETIN is certainly sent to the office of the *St. Louis and Canadian Photographer*. Hence it must be that our journal, and indeed, many other prominent periodicals, whose editors are glad to reckon Mr. Horgan as one of the staff, do not receive the attention in that office which they certainly deserve.

This particular journal has issued comparatively recently a circular, in which it claims to be free from all the influences of a stock house journal. The above quoted article, however, is a pretty fair indication that it was deemed advisable to favor no particular plate, which must necessarily be done if the article had been published. The BULLETIN and its publishers have no interest whatever in any of the plates quoted, and the article was published as a statement of experiments made by an authority, which experiments and results it was thought were well worthy of recording.

As to Mr. Horgan's personality, it is probably known to our readers that he is prominently connected with the color departments of the great newspapers, such as the New York *Herald*, the *Journal*, and other publications, and that he is considered one of the few competent experts on printing in colors and reproduction work generally.

◆

H. W. WILEY, in the *Journal of the American Chemical Society*, gives the following account of a lecture on color photography, delivered before the second International Congress of Applied Chemistry by Mr. Lippmann. "In the evening a lecture was given to the Congress in the amphitheater of the Sorbonne on color photography by Mr. Lippmann, who has achieved an international reputation by his researches into this important process. The principles of color photography were described and illustrated by apt experiments in conjunction with a projecting lantern. The process developed by Lippmann is based on the well-known properties of thin films, as, for instance, a soap bubble, to show colored bands due to the relation between the thickness of the film and the length of the waves of light. Mr. Lippmann has succeeded in depositing on a glass plate superimposed films of silver of extreme tenuousness, and each of these films differs in thickness for each variation of color in the object producing the photograph. When the photograph is thus constructed, it happens that, when it is viewed by reflected light, every color of the object photographed is exactly reproduced. A large number of these photographs, representing paintings, flowers, landscapes and persons, was projected by reflection with the most vivid verisimilitude. Perhaps the most interesting of these was the spectrum of argon, in which the blue bands were shown in perfectly natural colors and clearly defined. The photographic effect is secured by exposing a perfectly transparent sensitive plate, backed by metallic mercury, in contact with the film. The sensitive surface of the plate is turned away from the object to be photographed. The plate-holder for this operation was shown and is remarkable alike for its ingenuity and simplicity. The importance of color photography, as a means of fixing objects for study, is as great as its usefulness will prove to be in preserving with all the tints of vitality the faces of friends and the beguilements of beauty.

Mr. Lippmann kindly granted to Mr. Doremus and myself a private interview after the lecture, where we had a better opportunity to examine the negatives. They resemble the daguerreotypes of forty years ago, and a distinct view of the image is only obtained by inclining the plate in the proper manner to secure the reflection of the light. Unfortunately, these negatives are not capable of being reproduced as positives as in the case of ordinary photography, and we are, apparently, as far away as ever from multiple printing color photography."

F. H. Latimer writes that the addition of oxalic acid to the sensitizing solution considerably augments the rapidity of ferroprussiate paper. The formula recommended is as follows :

1.

Citrate of iron and ammonia	300 grains.
Water	3½ ounces.

To this sufficient ammonia is added to give the solution a decided odor.

2.

Potassium ferricyanide	300 grains.
Water	3½ ounces.

3.

Saturated solution of oxalic acid.

Nos. 1 and 2 are mixed in equal parts, and to every 10 parts of the mixture 3 parts of No. 3 are added.

The advent of the Christmas season brings thoughts of Christmas cards. The old card, with its tawdry embellishments, has given place to a plain, simple mount, with appropriate inscription and place for photograph. A view of a waterfall, or some pretty country bit, mounted on one of these photographic Christmas cards, makes a pretty and sensible gift.

It is sometimes desired to print from a small negative upon a comparatively large piece of paper. This is best accomplished by using a printing frame of the size of the paper, placing a sheet of plain glass in the frame. From the center of a piece of cardboard of the same thickness as the negative, an opening is cut of the size of the negative. This latter is placed in the opening, and the light excluded from the edges by pasting opaque paper all around the negative. A print may now be made by vignetting, and no trouble encountered from the bending or breaking of the sensitive paper.

RESIN PAPER PRINTING.

THE use of resin as a medium for silver printing is not by any means new, but perhaps our readers are unfamiliar with the method. In the *Photographic News* working details are given, and, as it gives an image without a glazed surface, there is every reason why those fond of experimenting should work out the process for themselves on the following lines. Resin paper may be prepared in two ways, either as plain resin paper, similar to plain silver paper, or as an emulsion paper.

The plain resin paper is prepared as follows: A shellac solution is made by powdering some white shellac, and boiling it with ammonia and water. The proportions are:

White shellac (powdered)	48 grains.
Ammonia, .880	24 minims.
Water	1 ounce.

The shellac should be mixed with the water, the ammonia added, and the mixture heated until all the resin is dissolved. This shellac solution will keep almost indefinitely. To prepare the salting solution, dissolve 12 grains of arrowroot and 12 grains of common salt in 1 ounce of water and add to it, with constant stirring, 48 minims of the shellac solution, for ordinary smooth-surface papers. For drawing and other rough-surface papers, the quantity of shellac solution should be doubled. The paper is sensitized with the following solution:

Silver nitrate	120 grains.
Citric acid	80 "
Distilled water	2 ounces.

The sheet of paper is pinned down on a clean board, the required quantity of silver solution is poured into the middle of the paper and rapidly distributed by the aid of a brush.

The emulsion resin paper is prepared according to the method of Valenta. The resin solution or soap is mixed with the salted gelatine and precipitated by the addition of an acid, preferably citric acid.

Dissolve:

Ammonium chloride	48 grains.
In distilled water	1 ounce.

and add

Gelatine	20 grains.

This should be allowed to soak for two hours, and should then be melted by the aid of gentle heat. The resin soap is then made by dissolving

Light French resin	20 grains.
Ammonia	20 minims.
In distilled water	¼ ounce.

The ammonia and water should be heated, and the finely powdered resin added in small quantities, with constant stirring, more ammonia being added, if necessary, to complete the dissolving of the resin. This resin solution is now added to the gelatine solution, with constant shaking, and the total bulk made up to 2 ounces with water. Hydrochloric acid is now added very carefully, drop by drop, until the solution is neutral to litmus paper. Then a saturated solution of citric acid is made and added, a little at a time, to the warm gelatine and resin solution with constant stirring till it turns milky and has a strong acid reaction. This solution soon sets to a jelly, but must be used warm. Sensitize by brushing over it the following solution :

Silver nitrate	120 grains.
Distilled water	2 ounces.

Very rich warm black tones may be obtained with this paper.

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ON THE COLOR OF NEGATIVES AS INFLUENCING THE PRINTS FROM THEM.

THOSE who remember the introduction of the present dry-plate process—or rather the time when it began to oust the wet plate—will also remember the marvelous colors of many of the negatives that were produced, and also the astonishment of old hands—not yet converted—that some of these negatives, certainly miserable-looking objects as compared with a collodion negative, would produce really good prints. Often we have heard the exclamation, "You don't mean to say you expect to get a decent print from that!"

It is all a case of color of negative. This is a subject that used to be much discussed, but that is little thought of now, modern developers nearly all giving a close approach to black in the image. A communication to a contemporary called our attention to the subject some time ago, and caused us to hark back to the pre-sulphite days, and to develop some plates with several of the old developers that gave a distinct brown or yellow image.

In considering this subject, it is necessary to make a clear distinction. If a negative is colored, there may be one of several things. The image only may be colored, the shadows, if these be without deposit, being clear and colorless ; the film may be colored, in which case the clearest shadows will show the tint as well as the image, or the shadows alone may be colored, as in the cases of green and red fog, pests of fifteen years ago that are scarcely known now. Of green and red fog we have nothing to say here. In the early days of gelatine dry plates, using the pyro developer, about the best that was looked for was a colored image plus a colored film. The color of the deposit by transmitted light was a greenish brown, and that of the film a yellow, or, in some cases, even a brown.

These old negatives gave magnificent prints, but oh ! what a time the printing took ! and there was no bromide paper in those days.

Then there came the introduction, by one who signed himself "J. C.," of the acid alum bath—saturated solution of common alum 19 parts, hydrochloric acid 1 part. By the use of this the color could be removed from the film, but not from the actual image, though that was made to appear more nearly black, on account of the removal of the yellow color from the film in which the deposit of silver was imbedded. It was noticeable that distinctly softer prints resulted after treatment with the acid alum bath than before, from which fact some argued that the opacity of the actual image was reduced. Probably it was not, but the action was the converse of that in which we print through light yellow glass, if a negative is just a shade too thin. We do not know that any explanation has ever been given of the undoubted fact that a slightly stronger print is got if the light be yellow than if it be white. The effect is not due merely to the longer time taken in printing. The use of a yellow film for printing through, when negatives are just a trifle thin, has been known for a long time. In the old books on the wet process we find it recommended, in the case of such negatives, to varnish with a yellow varnish.

To return, however, to negatives of the presulphite days. It may be of interest, as a matter of history, to note that sulphite of soda was recommended by the late Mr. Herbert Berkley long before the acid alum bath, but that the suggestion fell flat, and remained so for years. Perhaps this was due to the very imperfect supply of even fairly good sulphite at a moderate price. We remember finding the first sample of sulphite a complete failure, and concluding that there simply was no effect at all brought about by the use of the substance. It was only when Mr. Berkley showed the result of the use of sulphite at the (now Royal) Photographic Society of Great Britain that the use of it became general.

The negatives with colored image and colored film gave, as we have stated, splendid prints, but they were "too awful" in the matter of time of printing. They became things of the past as soon as a way was found of removing the color from the film.

How about a negative with a colored image and a clear film, however? One that will be got by the use of nearly any of the old developers, such as, for example :

A.

Pyro	1	ounce.
Citric acid	¼	"
Water, up to	10	ounces.

B.

A 10 per cent. solution of crystalline carbonate of soda.

For use, 1 ounce of B and 40 minims of A to be taken, the whole to be made up to 2 ounces with water.

Negatives to be treated with the acid alum bath.

Those who are accustomed only to the most modern developers, always giving black images, will at once note one thing on using such a developer as this, namely, that, if the development be carried so far as to give a density that appears to them to be right, the prints, by nearly any process, will be very hard. Indeed, when the image is of a distinctly greenish brown color, the negative that will give a good print is a very poor, thin-looking object. The question is, does such a negative give a better print than is got from a negative with a black image of a corresponding density?

We have made some experiments to try to decide this question lately. We produced some negatives, using the developing formula given above, and looked out some negatives made about eight years ago, at a time when we could not get a supply of sulphite, and printed on the same kinds of paper from thin and from negatives with black images. It is very difficult to be sure of the result of comparisons in such cases, because it is difficult to be at all sure that negatives with different colors of image have "corresponding densities." It appeared to us, however, that, at least in the case of silver printing processes—those tried were albumenized paper, plain paper, gelatino-chloride and collodio-chloride—an advantage was derived from the color of the image. Toning seemed to be easier, and the resulting color seemed to be more pleasing in prints from negatives with a colored image than with a black.

At any rate, this is a subject worth more consideration than it receives at the present time.

We conclude with the time-worn advice to remember that the negative is only a means to an end, not in itself an end.

W. K. BURTON, in *Photography*.

All communications regarding the December issue of the BULLETIN *should reach us not later than November 18th.*

STEREOSCOPIC PHOTOGRAPHY.*

IT is not my intention to enter into any learned disquisition, or give you a scientific paper, but merely to bring my subject before you in a simple and practicable manner; and, as I have experienced so much pleasure in the practice of stereoscopic photography, I feel impelled to try and induce some of you to enter this pleasant path, and taste what has proved to me the great enjoyment to be derived from this branch of our art.

I should like, first of all, to state that in my opinion the stereoscopic camera is the most perfect of all.

Man has two eyes given him, and we may reasonably suppose that however ornamental and beautiful they may be, and however wonderfully they act as windows for our inmost thoughts, and ofttimes speak more eloquently than lips or tongue, yet they were not made merely for ornament, but for use.

We need our eyes to see with. It matters not how lovely the landscape, how beautiful the form, how exquisite the color; if we had no eyes everything would be a sealed book to us, and instead of being children of the light we should have to spend our existence in endless night.

We need two eyes in order to see an object properly; hence, instead of being created with only one eye, placed, say, in our forehead, we are provided with two.

You will remember seeing on the screen the other night the eye of a fly. As he has so many things to look after and attend to, he has some thousands of eyes. We have, however, to be satisfied with two.

I have no doubt you have noticed the difference to be obtained by looking at a distant object through a telescope and an opera glass; in one case only one eye is used, in the other two.

If we had only one eye everything would present a flat appearance. We should not experience that effect of solidity we realize with two; and, from an artistic point of view, at any rate, we know how very undesirable such a result would be. Hence it frequently happens that our photos—when there is very little contrast of light and shade—when the light is not good, etc., have a very uninteresting, and what is technically known as a flat, appearance.

Let anyone try the experiment of walking up to a table with one eye closed, and snuffing a candle placed there. You will be rather surprised to find that, instead of performing that simple operation successfully, it will require one or two trials before you judge the right distance.

Or try to fill a tumbler placed on the same table under similar circumstances, and the chances are the water, instead of going into the tumbler, will flood the table.

Try the experiment of looking at an object first with one eye closed and then the other, without altering your position, especially some near object, and you will find that it presents quite a different appearance at one time to the other.

Hold up a photograph edgewise, look at it with one eye closed, and you are able to see the picture; close that eye, and open the other, you lose sight of the photo, and see only the back of the card.

We really see objects from two different standpoints, in fact we get two impressions--a right eye one and a left eye one—in the stereoscopic camera with which each of us has been so wonderfully provided, and with which we are taking snap-shots every waking hour of our lives. The two pictures are then so combined by the mechanism of our eyes, nerves, and brain that they coalesce, and, instead of seeing double, the images are united; one picture is formed, standing out clear and solid in perfect relief.

This is just what the stereoscope does for photography. Instead of having a camera with one eye or lens, we have two lenses, really two cameras combined, and so I say to my mind the stereoscopic camera is the most perfect of all.

The lenses are fixed about the same distance apart as the human eye, 2½ to 3 inches from center to center. The right lens takes an impression of the object from its standpoint, showing more of the right side than the left, and the left lens takes a view from its standpoint, showing more of the left side than the right, exactly in the same manner as our eyes. Thus two distinct pictures are obtained on one plate (two quarter-plates on one half-plate.)

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* Paper read at the Working Men's College Photo. Club, Australia, by Mr. T. C. Camm.

The stereoscope invented by Wheatstone, and perfected by Sir David Brewster, unites these pictures by means of two prisms arranged at a certain angle, and a stereoscopic view is the result. To a person who has never seen a stereoscopic picture, the first view is somewhat marvelous. Here you have two pictures apparently of no interest, seemingly perfectly unmeaning—a conglomeration of dark and light patches—and on looking at them you feel inclined to pity the crank who has produced a pair of such miserable-looking things. But place them behind the magic lenses of the stereoscope, and what a transformation!

In an instant the scene is replete with life. It is not a picture you are looking at. The reality is before you; the scene in all its details is there, everything stands out in perfect relief, everything is solid, everything real. You feel as though you had only to take one step to be in the midst of well-remembered spots, and linger long amid the beauties of hill and dale, mountain, plain, or river.

You can almost fancy you hear the breakers roar as you see them lashing in their fury the rocks at your feet; or hear the rippling rivulet dashing down the mountain glen, as it sheds its silvery spray on feathery fern and mossy boulders, murmuring its blithesome melody as it hurries to the sea; or listen to the music of the forest wild as you gaze on Nature's tangled wildwood and peep into the lyre bird's nest in fairy dells; and scent the perfume of native musk and forest wild flowers as you see once more the mossy banks covered with delicate ferns, enameled and bespangled in rich profusion with Nature's sweetest blooms; while, as you gaze on features well remembered, you feel it is not a portrait you are looking at, but the friend of long ago is there. You gaze into his eyes, and catch, as in days of yore, the merry twinkle lurking there, and hear once more the well-remembered music of lips long silent, which seems to float around you in notes of sweetest cadence,

[illegible] H. [illegible] NOVEMBER WOODS re-vibrating many a lost chord of fondest recollection, and thrilling with emotion the heart of each beholder.

We must leave our flights of fancy, however, and come to practical work.

There are three ways of practicing stereoscopic photography.

First.—To have a regular stereoscopic camera, and use it for that purpose only. There are many such in the market, and I need only refer you to a good catalogue, where you will find plenty from which to make a selection.

Second.—An ordinary half-plate camera, having a quarter or half-plate lens fitted into a sliding front. You first take a picture, say the right side, which fills one-half of your half-plate. Put on the cap, and slide the front 2½ or 3 inches; then take a view of the same object on the other half of the plate, having a partition down the middle of the camera.

Third.—An ordinary half-plate camera, having a separate front fitted with two quarter-plate lenses.

The plan I adopt is the third one. I have here a camera which I use for half-plate work of every kind. After taking my picture of a landscape, if I want a stereoscopic view of the same, all I have to do is to remove the front holding the single lens, and insert in its place the other front with two lens. Then I place this diaphragm in, in a second, and I have virtually two cameras, my stereoscopic cameras, complete. Thus, I really carry three cameras with me, and I can take half-plate, quarter-plate, or stereoscopic views. Very successful work may be done with one lens, provided the conditions of light, exposure, etc., be the same; but to have perfect work the two pictures must be taken at the same instant, thus necessitating the use of the stereoscopic camera proper.

Having your camera and dark slides ready, the manipulations of focusing, exposure, development and printing are exactly the same as for ordinary photography.

In taking a stereoscopic picture you can leave your tomahawk at home, because what you would cut away to enable you to get a good view for an ordinary photo will, in all probability, make a very interesting part of your stereoscopic view. A little more trouble is caused in mounting stereos than ordinary cards. It is necessary that the print taken by the right eye lens is placed opposite the right eye, that by the left opposite the other one, when mounting them. I have a print here just out of the printing frame, and you see it is quite the reverse. This side was opposite the right lens, and this the left. It is necessary, therefore, to divide them, and mount on the card in such a way that the above conditions are fulfilled.

Before they are divided it is best to mark them. I always put the letter R at the back of the half which was opposite the right lens, and then there can be no mistake, because, unless they are mounted in this manner, the stereoscopic effect will not be produced. If you were to mount two photos taken by the right lens, or two taken by the left lens, no stereoscopic effect would be seen, nor would any such effect be had if two ordinary photos be mounted on one card and looked at through the stereoscope. You must have two distinct pictures, taken from two different positions, of the same object, and, however poor and tame they may appear, the stereoscope makes them instinct with life.

In mounting stereos, I use a piece of glass the exact width of the stereos—3¼ inches—and the length of the negative; in fact I cut a negative to that width. I first place this on the print in such a position that I get a twig, or stone, or any object, in both pictures in a straight line. I then trim the top and bottom to this width, thus insuring that my pictures are in the same position. I next take two pieces of glass, 3¼ by 2¾ inches, and place them on my prints in such a manner that they both cover the same object. It becomes then an easy matter to trim them to the exact size, when they can be mounted, making sure that the one marked R goes to the right.

The stereoscopic views can be printed on glass, in the same way as a lantern transparency. You can either have a single plate, 5½ inches by 3¼ inches, or take two ordinary lantern plates, and bind them together after printing. I should like to say one or two words on the advantages of stereoscopic photography.

First.—And chief, a more realistic picture is obtained, and greater pleasure afforded.

Second.—The same picture can be used as an ordinary quarter-plate one.

Third.—You have two negatives to print from for this purpose, instead of one, which is an advantage if a number of copies be required.

Fourth.—Enlargements can be made from them very easily.

Fifth.—The negatives are just the size for lantern transparencies.

I hope that as the result of our consideration of this subject to-night some of you will take up this most interesting branch of art, and I can assure you that your love of photography will be augmented to a considerable degree. Your stock of stereos will soon accumulate, affording an unlimited source of exquisite pleasure to yourselves and friends; and you will never regret, I feel perfectly assured, that you started to practice stereoscopic photography.

TWO KINDS OF SILVER.*

IF we look at the silver contained in negatives and printing-out papers, an essential difference will be observed as regards color. The former is black, the latter is from yellow to orange in color. And still in both cases we have pure metallic silver. It appears, therefore, in different modifications. In the yellow or red form it is very finely distributed; in the black form the single molecules have united to larger complex particles. The silver of the developed dry plates is black, because it has been reduced from coarse-grained bromide of silver. That the "ripening," and not the bromide of silver by itself, is the cause, is shown by the fact that, with an unripe bromide of silver gelatine emulsion, red tones can be produced. In the wet collodion process, the black silver is formed by physical development, more silver gradually settling upon the exposed iodide of silver molecules.

With the printing-out paper, the fine distribution of the chloride of silver is the cause of the yellow-red coloration.

But the form of the original silver salt does not always so directly affect the color of the finished picture. On the same kind of chloride of silver—developing paper—red as well as green tones can be obtained, according to the manner of exposure and development. I have been able to determine that this is connected with the time of development. After a short while in the developer the tone is red, and the longer the picture is left in the bath it will pass more and more into greenish black.

This is only indirectly dependent on the duration of exposure. To leave the picture sufficiently long in the developer to produce the green tone, it can have only a short exposure.

With the bromide of silver gelatine plates, the oxidation products of the developer can settle upon the black silver, and thus modify the tone. The origin of the tone of the chloride of silver papers is not connected herewith. In their case the question is only about pure metallic silver. The cause has not been explained yet. The red coloration may probably have its origin in the fact that at first only the surface of the chloride of silver particles passes into metal, and only after longer action of the developer the reduction extends to the interior.

Easier to comprehend is the similar behavior of the weak and not fully printed-out chloride of silver gelatine papers (with nitrate of silver in excess) in the development with gallic acid. There is a physical development, as in the wet collodion process. After remaining a short while in this bath the exposed chloride of silver molecules will be enlarged but little by the forming silver; the picture looks, therefore, red after fixing. With longer development the silver grain grows, and the picture will become olive green, and finally green black.

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*R. Ed. Liesegang in *Wiener Phot. Blätter*.

CHINESE AND INDIANS AS SUBJECTS.

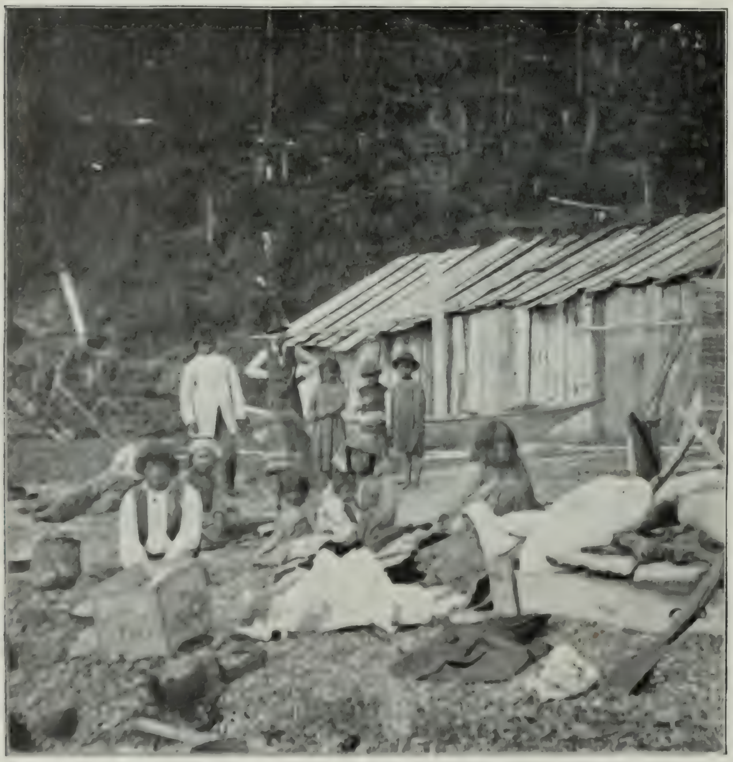
UP to within the last few years it was no easy matter to get a good likeness of an Indian or Chinaman if either knew it. They both agreed upon one thing (probably the only thing they ever did agree upon), and that was, that a camera was something to be looked upon with suspicion and to be shunned on all occasions.

SOME CHINESE CHARACTERS.

The Chinaman called it a "devil's box," and the Indian regarded it as "strong medicine," likely to wield an evil influence over him. No doubt the Indian was sincere in his belief; but from what I know of John Chinaman, I feel certain that he refused to be photographed simply because he feared it might compromise him in some manner, and not because, like his dusky brother, he dreaded being bewitched. On the Pacific Coast, the Chinese have been a thorn in the flesh of certain whites, and many times in the past the Celestials have been subjected to ill-usage, and even death, at the hands of lawless characters. Therefore, whenever a Chinaman saw a white man regarding him attentively or endeavoring to photograph him, he thought it meant some new scheme detrimental to his interests, and straightway took refuge within the shelter of his dark, noisome dwelling, where a powerful flash-light would hardly suffice to steal his image.

I remember walking more than 5 miles one day to get a view of some Chinese farmers as they worked in their picturesque costumes, long queues and bamboo-strip hats. After much persuasion I got several of the laborers to sit for me, when unfortunately the boss came along. He would not think of such a thing for a minute, and ordered the men back to work with forcible language, while I trudged back home without the coveted views.

It was the clause in the Chinese Exclusion Act, requiring every Chinaman in the country to register and have his portrait affixed to his certificate, that overcame the prejudice of the Celestials against the camera. The leading Chinese of the United States fought this clause bitterly, and, until the matter was finally decided in the Supreme Court, not a man had registered. Finding out at last that Uncle Sam was in earnest, they succumbed to the inevitable and proceeded to



PUGET SOUND INDIANS AT HOME.

obey the law. Then they couldn't get photographed quickly enough. A professional friend of mine was kept busy for several days simply making exposures, and made a neat sum at a dollar apiece for a single unretouched print.

The registering officer especially cautioned photographers against retouching the prints, and requested that any facial peculiarities be given prominence, to make identification as sure as possible. Consequently, many of the Chinese were dissatisfied with their appearance and came for a re-sitting, with the request that "you makee heap slick."

The ice thus broken, my friend continued to enjoy a profitable business with the Chinese of the town. Men brought in their wives, babies and, incidentally, themselves for portraits, and easily pleased, prompt paying customers they proved to be. One peculiarity of the Chinese is to get as much as they can for their money in point of size. A Chinese laborer will buy a shirt or a pair of boots much too large for him, simply because he is getting more material for his money. So, when they come to have pictures taken, they insist on large heads, and rarely are they pleased if you break this rule.

It was the snap-shot camera that reconciled the Indian to being photographed. He found out that, no matter how sharp he was, there were others sharper, who succeeded in catching his likeness in spite of his vigilance. Going along the street he would find, in the window of some dealer, numerous views of the Indian encampments, and perhaps his own physiognomy exposed for sale, and he not aware that a camera had been within a mile of him. Now, the Indian of to-day is not

AN OLD CANOE-MAKER.

the guileless creature he was a score of years ago, when for a few beads or a colored blanket he would exchange furs worth hundreds of dollars. He has gone to the other extreme, and to-day conducts bargains with a skill that would make a Baxter street Jew turn green with envy. So now he graciously allows you to photograph him (if he is in the humor), but you must pay well for the privilege. He has an idea that whoever takes a picture of him or any of his surroundings will make a fortune from the sale of the view, and he has been civilized to the point where he clamors for a portion of the proceeds. It is of no use to tell him that it is simply for "Kultus Mamook" (just for fun) that you are taking his likeness. He cannot comprehend why anyone should work for nothing, and, believing that you are trying to deceive him, waxes still louder in his demands for "chickaman" (money). When they have a supply of whiskey about the encampment, the Indian is apt to be rude and quarrelsome. More than once I have been roundly cursed and ordered to leave the place, and, not complying with the demand, my camera would probably have been subjected to rough usage, had I not been near civilization.

I have a number of pictures descriptive of Indian life in my collection, nearly all of which cost me a little something, as I have always endeavored to retain their good will. The picture of the old Indian making his canoe (a very difficult subject indeed to obtain) cost me 25 cents, and no end of coaxing. Often I have handed them a small sum, which they take readily enough, but when you come to make an exposure on them they turn their backs, which are certainly not beautiful enough to justify the cost of a plate.

There is much about an Indian encampment that is interesting and worth preserving; their dress, dwellings, primitive manner of cooking and living, and most of all, their beautiful canoes, which for graceful outline, lightness and sea-worthiness are not equaled anywhere by native tribes.

James G. McCurdy.

"In posing for the head and bust only, the greatest care should be given to the direction in which the sitter is looking, both with regard to the lighting and to the pose of the head. The two should always be associated. When a man turns his head it is generally to look at something that is attracting his attention, but in photographic portraits it is by no means unusual to see the head unaccountably turned in one direction and the expressionless eyes in another, in a way which is utterly destructive of realistic effect. Of course, the eyes need not necessarily look straight out from a face, but there should be no such violent contrast of direction or action between the eyes and pose of the head as gives the expression of something forced or artificial."—A. H. Wall.

It is probable that in the near future instead of copying business letters in bulky letter books, the day's correspondence will be photographed and the print pasted in an album. A hand magnifying glass will render the writing readable, and the saving in labor and space will be considerable.

LANTERN WORK.

WITH the coming of the long evenings and the commencement of active operations by photographic societies, activity in lantern-slide matters has been renewed. In the making of a lantern slide there is one portion of the operation concerning which little has been written, but which is probably more important than the development, or, indeed, any other of the many details in the making of a perfect slide. The demand for lantern-slide mats has considerably increased during the past month, and a word or two on the use of these mats may be timely. The average slide-maker purchases a package of ready-cut mats, of one size and shape of opening, or, perhaps, an assorted package, with some half-dozen shapes of regular orthodox patterns. All the slides are matted with one or other of these stock mats.

When a negative is made, it is usually the case that a by no means inconsiderable amount of landscape is included that had better be dispensed with, if it is desired to obtain a result that shall approach the pictorial. This is accomplished, of course, by trimming away the undesired portion. If, in a print, certain portions are considered objectionable, the same applies with equal force to the lantern slide. When a slide is made by copying in the camera, the desired portion only may, in many cases, be copied. But in slides made by contact, and in all cases where certain portions only of the slide are wanted, the undesired parts must be blocked out by a lantern-slide mat.

In every case, before making a slide, a print should be made and carefully examined. That part of the print that it is desired to include in the picture should be marked off or cut out, and, when the slide is made, this portion should occupy the center of the lantern-slide plate. Lantern-slide mats are now made from which any desired opening may be cut solely by the aid of a sharp pocket knife, and these are to be recommended for the fact that they permit of easily obtaining a mat of any size and shape. The marked print is used as a guide for the size of the mat, and the lantern slide thus made to conform to the ideas of the operator.

ON JUDGING LANTERN SLIDES.

OUR local amateur photographic society has for the last five years offered two prizes for the best and second best sets of six lantern slides sent in by members for exhibition at the annual meeting. The offering of prizes, since the society is in a flourishing financial condition, is a matter of no difficulty, nor has much difficulty been met with in getting entries, for, as a rule, about a third of the total number of members contribute. In fact, there are few of the slide-making members who do not send in a set; but the difficulty has arisen in framing a satisfactory scheme for awarding the prizes. We cannot afford to pay the fees and traveling expenses of an outside judge, so that we have had to make the awards by the votes of members present at the exhibition. We have tried several schemes, altering them from year to year, as defects were discovered in the working, and have now arrived at an arrangement which the experience of two years has shown to be satisfactory to all concerned. Other societies may have met with difficulties similar to those which have beset us, and if they have not already found a way of overcoming them, they may be glad to have the benefit of our experience; so I will here set down a short account of the various schemes we have tried, and the final result at which we have arrived.

On the first occasion, it chanced that all those who had entered slides and no other members were present at the meeting, and an arrangement was agreed to that no one should vote for his own slides. The slides were shown in separate sets, the commencement and end of each set being announced by the honorary secretary, but the names of the members who had entered them were not made known. At the conclusion, each member wrote his vote on a slip of paper, folded it, and put it into a ballot box. When this box was opened and the papers examined, it was found that the votes were equally distributed among the competitors, a result that pleased no one. The next year the same system was tried at a fuller meeting and a more definite result was arrived at, the competitors being separated by a considerable number of votes; but in conversation afterwards it came out that many of the members had voted for this or that set because it contained some particular slide that had taken their fancy, so that it was possible that the winner of the first prize had gained it because one especial slide had found favor in the eyes of the majority of those present. Proposals for a change were made, and the next year the slides were shown in sets; but the members were provided with lists of the numbers and titles of each slide, against which they were directed to place the class—first, second, or third—into which they desired to put each slide as it

PORTRAIT STUDY BY GODFREY.

appeared on the screen. Those members who had entered slides were directed to award classes to their own slides. At the conclusion the marked lists were handed to the officers of the society, who reckoned each first class as worth three marks, each second as worth two, and each third as worth one. The marks gained by each set were added up and the prizes awarded accordingly. Conversation, after the result had been made known, showed that the system did not meet with universal favor. Competitors did not like awarding classes to their own slides, and non-competitors said that in nearly all instances, although the names of the producers of each set were not announced, yet some one slide revealed their identity, and so they knew whose sets they were voting for, and, either feeling a bias in the favor of some friend, found it hard not to overestimate the value of his work, or, from fearing to favor, gave a lower class than they otherwise would, in all probability, have done.

These difficulties led to further revision, and the scheme at present in use, which seems to work well, was devised. The plan is as follows: Each competing member sends to the honorary secretary, a few days before the meeting, either the slides themselves or their titles and descriptions. When the secretary has the full list before him, he shuffles the slides, so to say, keeping, of course, a key for his own use and arranging them roughly according to subjects—landscapes, seascapes, river views, figure subjects, architecture, animals, etc., and numbers them consecutively. Thus it by no means follows that because slide No. 5 is by Mr. A., slide No. 6 will be his also; hence, though some member may be able to guess at the name of the maker of some one slide, he will not of necessity know all the other slides of the same set. The honorary secretary then writes out a sufficient number of lists for each member who is expected to attend to have one.

When the time for exhibiting the slides comes, they are first passed in order through the lantern, the title of each slide being announced, so that the members may be able to form a standard in their own minds; then the slides are passed through again slowly, and the votes are recorded on the prepared lists which have been handed to the members. The honorary secretary, who alone knows who have produced each of the slides, does not vote, and no competitor records any vote for his own work; but, with these exceptions, each member present places each slide in the first, second, or third class according to the best of his judgment. At the conclusion the votes are estimated and added up as already described, and the honorary secretary on his key list enters the total marks gained by each slide opposite to its number, and then adds up the total of the marks gained by each set. One thing, however, remains to be done; and that is to give an average to fill up the blank spaces left in his list by each competing member opposite to the numbers of his own slides. That this is necessary will be seen from the following considerations. Supposing that twelve members are present and that one of them has entered a set for competition, and that all other competing sets have been entered by members who are not present, then each of these last will receive votes from all the twelve members present, while the first will only receive votes from eleven persons as the member who has entered them cannot vote for his own work. He would therefore be [illegible] disadvantage unless some allowance is made him; he therefore will have one-eleventh of the marks gained by his set added to form his total. The fairness of this method has been acknowledged by all of our members, and the method reduces to a minimum any unfairness that would arise from the individual predilection felt by the various members for special subjects or styles of working.

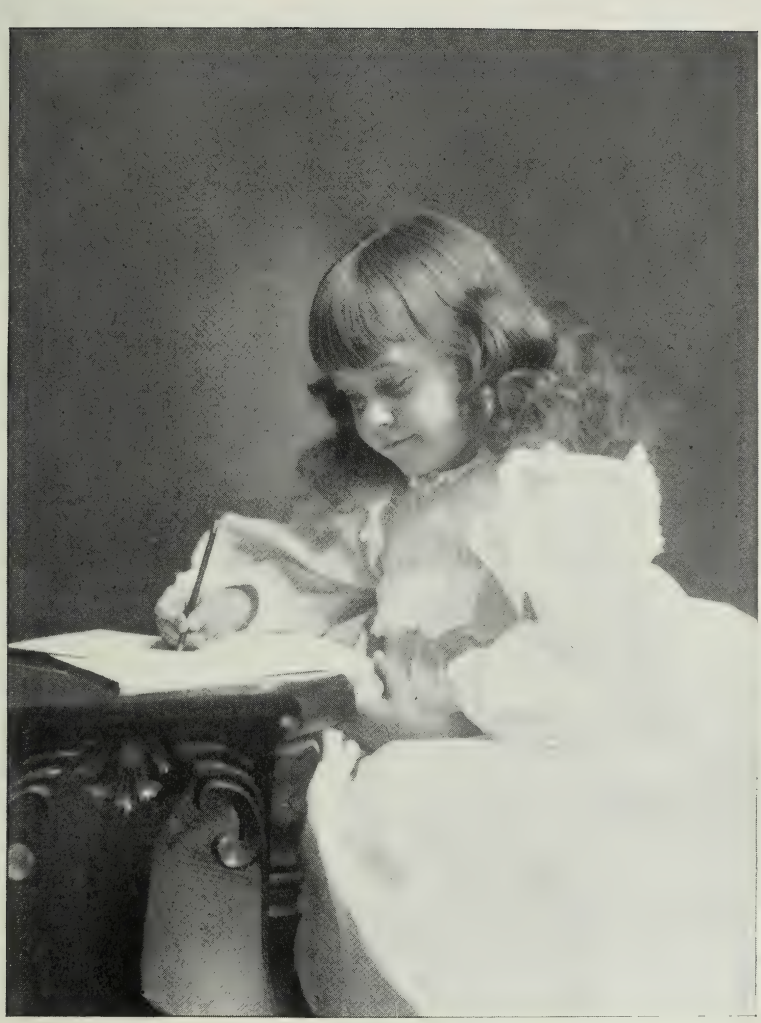
T. Perkins in *The Optical Magic Lantern Journal and Photographic Enlarger.*

* * *

At the regular meeting of the Photographic Section of the American Institute, held Thursday, October 8th, at 113 West 38th street, New York, Mr. Edmund Hudson, of Hartford, Conn., gave a lantern-slide exhibition, using an automatic projection lantern, by the aid of which the lecturer at the screen changes the slides in the lantern by pressure on an electric push button. The slides are carried on a traveling band, and each pressure of the button starts a clockwork movement which brings a new slide into position. The slides are stored in a case, which serves as a stand for the lantern. While some few hitches occurred, the success of the scheme was acknowledged. Such an arrangement, of course, must have its limitations, and the presence of an assistant at the lantern is certainly desirable. Limes require turning, carbons require adjusting, and there are a dozen things that may require the attention of an assistant. On the other hand, the slides can be passed through by pressing a button near the lantern, and in this case the entire attention of the assistant may be given to the light, and all danger of reversed slides, mixing, and other hitches that annoy the lecturer, is averted. A series of slides illustrating a particular theme might be made on a strip of celluloid film, and run through the lantern by clockwork or by a hand wheel.

* * *

The vitascope has not as yet been used for advertising purposes, though we presume that it soon will be. Our large newspapers will spend much money on the display of election returns, and vie with each other in attempts to attract the public. A vitascope exhibition between announcements would effectively advertise the paper. In this connection we would again note that the easiest way to write on glass for temporary use in the lantern is the method described by Mr. D. L. Elmendorf. A piece of carbon paper, such as is used for typewriter work, is laid face down on the glass, and covered with a sheet of paper on which the desired matter is written. The carbon is transferred to the glass, and a capital copy thus obtained. The glass may be cleaned by simply rubbing it with a rag.



EARLY LESSONS.

Photograph by Van Loo & Trost.
Engraved by Weeks Engraving Co.,
Philadelphia, Pa.

SOCIETIES

THE Photographers' Association of Missouri will hold their 1897 convention at Pertle Springs, Mo. Officers: President, Wm. Latour, Sedalia; First Vice-President, O. L. Hutchins, Marshall; Second Vice-President, E. D. Fear, Odessa; Secretary, A. S. Robertson, St. Louis; Assistant Secretary, Mr. Stone, Warrensburg; Treasurer, Ellsworth Marks, Clinton.

◆

SPEAKING to professional photographers at the convention of the Photographers' Association of Missouri, the President, Wm. Latour, said: "I believe that the future success of photography, in a business sense, depends upon a more fraternal feeling, a more frequent coming together, a nearer touch of hearts and hands than there has been in the past among those who follow the profession. This I believe to be the stepping stone, the very footing course of the foundation upon which we desire to build. We must fraternize more. We must learn to know each other better. We must become better workmen—better men. Give photographers to know that these associations are reared and maintained for the welfare, advancement, and elevation of all reputable followers, be they from city or little hamlet, ever remembering that 'the same sun that lowers upon one looks frowningly upon the other.'"

◆

THE 1897 convention of the Photographers' Association of Kansas will be held at Leavenworth. Officers: President, F. D. Tripp, Newton; First Vice-President, Mr. Stevenson, Leavenworth; Second Vice-President, Mr. Avery, Salina; Treasurer, Mr. Miller, Arkansas City; Secretary, Geo. Dresser, Winfield.

◆

THE Brooklyn Academy of Photography offer an attractive programme for the balance of the year. Among other items, we note meetings for the selection and criticism of prints on November 9th and December 14th; lantern-slide evenings on November 16th and December 21st; discussion on developers, in which Messrs. La Manna, Fullerton, and Arnold will take part, on November 23d, and discussion on printing papers on December 23d, under the guidance of Messrs. Morrison, Goubert and Wintringham

◆

THE annual election of officers of the Daguerre Club will be held on December 11th. On December 29th there will be an exhibition of lantern-slides, for members only, at Dr. Sachs's school, 116 West 59th street, New York. The Secretary of the Daguerre Club is J. W. Flynn, M. D., 116 East 31st street, New York.

◆

AT the first annual competitive print exhibition of the Central Camera Club, Brooklyn Y. M. C. A., held September 21st to 25th, the following awards were made by the judges, Messrs. J. B. Morrison, J. O. Barnaby, and W. B. Vernam. Prize, W. H. Coughlin for print, "November Woods." Honorable mention to Charles E. Ordway, Frank E. Wheeler, F. F. Braillard, Jr., and W. H. Lowery.

THE DIAPHRAGM IN HALF-TONE WORK.

THAT our knowledge of the variations that are possible in the texture of half-tone engraving, through changes in the diaphragm, is by no means complete is in increasing evidence as the subject is further investigated. Dr. Eder has suggested some experiments in this direction which have been executed by T. J. Placezsk, and are published in *Photographische Correspondenz.*

The most important of his results are shown here, and, though of great value to all half-tone operators, they possess the greatest value in three-color work; for, through their use, without changing the position of the copy or screen, it is possible, by merely changing the diaphragm, to alter the direction of the lines. Besides, the texture or shape of the dots can be made different for each color.

It is well known that the screen dot is the product of a pinhole camera, since the transparent openings in the screen act like so many pinhole cameras lying close to one another. The formation of the dot on the sensitive plate is dependent on the shape of the diaphragm aperture, the distance of the sensitive plate from the screen, the focus of the lens, and the length of exposure. In making a half-tone negative, the diaphragms are usually changed during an exposure. A small stop, say *f*/20 to *f*/30, to get small dots in the shadows, and a stop *f*/10 to *f*/15 to fill up the high lights, so as to leave only small transparent dots in the negative. With a medium-sized stop, *f*/15 to *f*/20, a good negative can be obtained, when the subject permits, by the use of but this single diaphragm.

The accompanying cuts, showing the diaphragm alongside of the half-tone texture secured through it, do not need any explanation. The fine dot and large dot in Fig. 7 is very like the effect Mr. Levy obtained with his four-line screen, and would seem to indicate that such a complicated screen is unnecessary. The objection to this pattern of dots is that the smaller one etches away before a great depth is had on the plate. The pear-shaped dot, shown also in Fig. 7, is had when the distance between plate and screen is increased, though the same diaphragm is used. In all cases the screen was used in its normal position; that is, with its lines at 45 degrees to the sides of the negatives made. How readily the direction of dots can be changed by substitution of diaphragms is shown in Figs. 9 and 10. That it is a difficult matter to determine beforehand from the shape of the aperture in the diaphragm just what the resulting pattern of the dot will be, is illustrated by Figs. 4 and 12, where the dots are the same shape exactly, but reversed as to opacity. It can be seen that there are great possibilities yet to be found from variations of diaphragm apertures, and for that reason the subject will be taken up again.

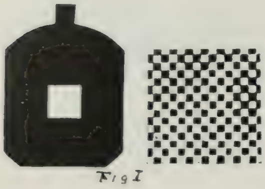


Fig I

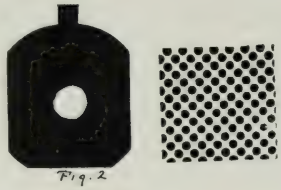


Fig. 2

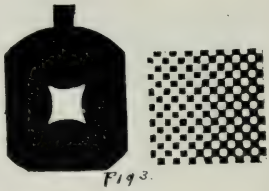


Fig 3.

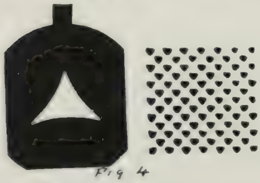


Fig 4

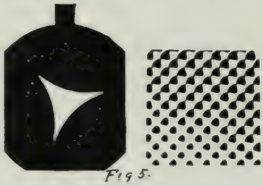


Fig 5.

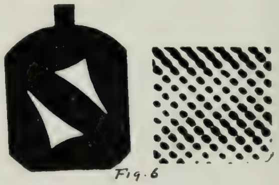


Fig. 6

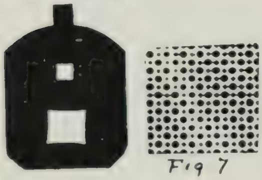
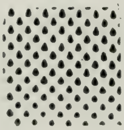


Fig 7



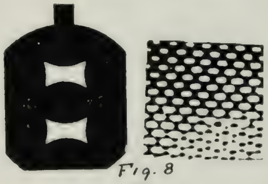


Fig. 8

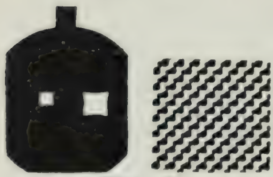


Fig. 9

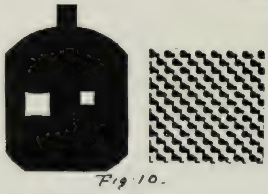


Fig 10.

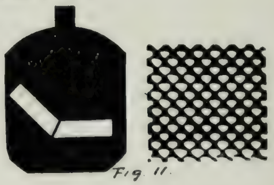


Fig. 11.

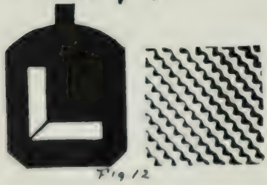


Fig 12

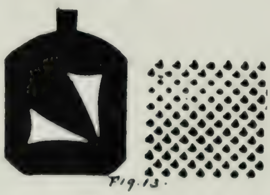


Fig. 13.

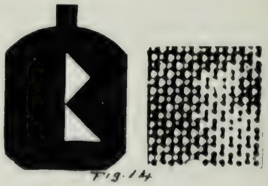


Fig. 14

MUTILATION OF COPY BY ENGRAVERS.

It is becoming the practice of late, with many of the magazines, to sell the original drawings of the illustrations used in their publications. These drawings are afterwards framed for wall decoration and are unique from the fact that, like paintings, they are the artist's original handiwork. On account of their salable value, or subsequent use in another form possibly, publishers are always fearful that their precious originals will be damaged by the photo-engraver, and not without reason gained by experience. The *Inland Printer* complains of the engraver's carelessness in the matter in the following vigorous way :

> " No one who has much to do with ordering process work can have failed to remark the general disregard which engravers seem to have respecting the condition in which the original copy is returned to the customer. The value of the original illustration or design is in no way impaired by the fact that a plate or plates had been successfully made, but the engraver generally returns the design so labeled, marked, marred, crushed and rolled, that its beauty is but a remembrance. Whether this is due to the lack of art sense which permits the commercial idea only to prevail, we will not pretend to say, but the engravers who leave the expensive original illustration and designs to the care of mere bundle boys to wrap up in rolls and return them mutilated to their customers are exceedingly short-sighted. This fault is not the fault alone of the cheap houses. It is prevalent among the best engravers, and is as unnecessary as it is annoying."

The time is not far distant when a large portion of the drawings submitted to photo engravers will be in color, both water-color and oil. In fact the illustrations for the *Century* are now drawn in color, orthochromatic plates being used for their reproduction, so it is the part of wisdom for photo-engravers to devise methods for keeping their " copy " clean.

WHY FISH GLUE IS USED IN THE ENAMEL PROCESS.

We are indebted to Mr. William Gamble for publishing the results of a long series of experiments he made to answer the question, Why use fish glue in the enamel process of half-tone engraving?

He began with a belief that some other medium could be found as a substitute for fish glue, and gelatine would appear at first to be that medium. It can be carbonized to resist acid, but it solidifies when cold, and cannot be developed in cold water. Further, it does not give as sharp dots on the plate on development as fish glue. The latter is easier to wash out in the unexposed portions, owing to its greater solubility. Carbon tissue is found entirely out of the question, therefore, for this purpose. So, also, is meta-gelatine; that is, gelatine dissolved in acid and neutralized.

So, gelatine is not the substitute. He then tried a number of other substances, such as lichen starch, Iceland moss, linseed mucilage, size from Scotch seaweed, and a gum from Ceylon seaweed, without succeeding in his quest. Gum acacia is difficult to develop, and cracks in burning in.

He scouts the idea of adding resins, lacs, or bitumen to the glue solution or sugar, on account of the danger of the latter making the film hygroscopic, when the negative would be liable to stick to it in the printing frame.

Fish glue solution containing albumen gives a film which does not swell up in washing out. It holds together better and develops a sharper dot. He finds, also, what I have always recommended—the value of a little chrome alum to aid in preserving the cohesiveness of the film during development. He suggests for this purpose 1 grain of chrome alum to the ounce of enamel solution, or a similar amount of pure chromic acid can be used instead of the alum.

Mr. Gamble concludes: "Taking it all in all, fish glue only needs proper handling—which is more a matter of experience than anything else—to secure as fine or finer results than can be obtained by any other medium." These experiments should relieve photo-engravers from a desire to seek any change in the enamel solution. The improvements that are taking place in the half-tone process are found in a better knowledge of the part the diaphragm plays in the work and in more skillful etching of the plates.

ENGRAVERS AND THE COPYRIGHT LAW.

It is safe to say that no article ever aroused the interest among engravers and process workers that was produced by the one entitled "Politics for Process Workers," in the September BULLETIN. It has been republished in all the leading publications devoted to the printer's art, as well as in the pages of the best of our photographic contemporaries. Engravers in all branches seem to have learned from this article for the first time how their business has been discriminated against by the existing copyright law. Many have been the expressions of gratitude to the BULLETIN for the interest it has shown in the welfare of the American engraver. Mr. Oscar E. Binner wrote: "Let me say that I know every photo-engraver will read with great interest your article in the September number of Anthony's Photographic BULLETIN. I have looked it over carefully, and must say that this article, 'Politics for Process Workers,' is a most timely one. I will bring up this matter at our next monthly meeting of the photo-engravers of Chicago." Mr. Donald L. Fraser, President of the Photo-Engravers' Union, wrote: "Although instructed a week ago by the Executive Board of Photo-Engravers' Union No. 1 to convey to you their thanks for attention called to omission in copyright law in Anthony's Photographic BULLETIN, I have not until now been able to do so."

Some of the larger photo-engraving houses expressed their thanks personally, but did not want to be quoted for the reason that they solicit trade from publishing houses affected by the present law, and they are afraid of antagonizing them. One proprietor, with more back-bone than is common among his fellow tradesmen, writes: "I believe that the engraver has as big a future as anyone, but if he will let people sit down on him and take away his bread and butter he is a chump, and, judging from the way in which some of them have been conducting their business, they have been chumps a good long while. This copyright law shows how easily they have been sat upon." All who are now acquainted with the facts in this matter agree that the law needs amendment, and, if the interest that has been awakened will not fall asleep again, something may be accomplished in the coming session of Congress.

* * *

A. C. Austin writes on "Color by Means of Photography" in the "American Process Year Book."

PROCESS NEWS AND NOTES.

AMMONIA etches aluminum with great readiness, providing it is sufficiently dilute. One minim of ammonia to 8 ounces of water is said to be sufficient.

* * *

BURNT sienna, with gum and glycerine, is recommended as a plate backing to prevent halation. Carey Lea suggests bathing the dry plates in red litmus solution, which stain turns blue in the alkaline development or washes away entirely.

* * *

MR. JOHN BYRON has patented a screen plate, in which the opaque portions are formed of enamel color incorporated in the glass by firing or burning in.

* * *

MR. H. W. VOGEL says that the commonly held opinion that the evening is more favorable to orthochromatic photography is erroneous. He says that in the morning and evening the red and yellow rays are exceptionally weak in diffused daylight and that blue objects appear almost white, while, on the other hand, if sunlight is present, the red and yellow rays are most prominent.

* * *

IN photogravure the chloride of iron solutions for etching are usually used at the following four strengths : 40, 35, 33 and 30 degrees Baumé.

* * *

PHOTO-ENGRAVERS' Union No. 1 of New York sent Mr. James Ryan as a delegate to represent them at the forty-third annual session of the International Typographical Union, held at Colorado Springs, Colo., on October 12th.

* * *

STEREOPTICON bulletins are now made by a typewriter on thin sheets of gelatine. The ink used is slightly oily, which absorbs powdered graphite that is dusted on it. The gelatine is mounted between two cover glasses and is ready for the lantern.

* * *

IT is just fifty years (1846) since Schönbein discovered gun-cotton, and Archer afterwards utilized it in negative-making.

* * *

"PHOTO-ENGRAVING Made Easy " is the title of a little book by John Lemane, published in Sydney, N. S. W. It is said to be the first photographic hand-book issued in Australia.

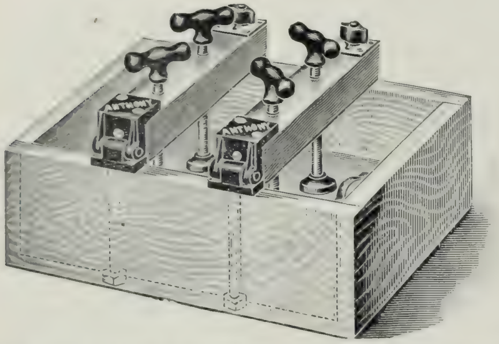
* * *

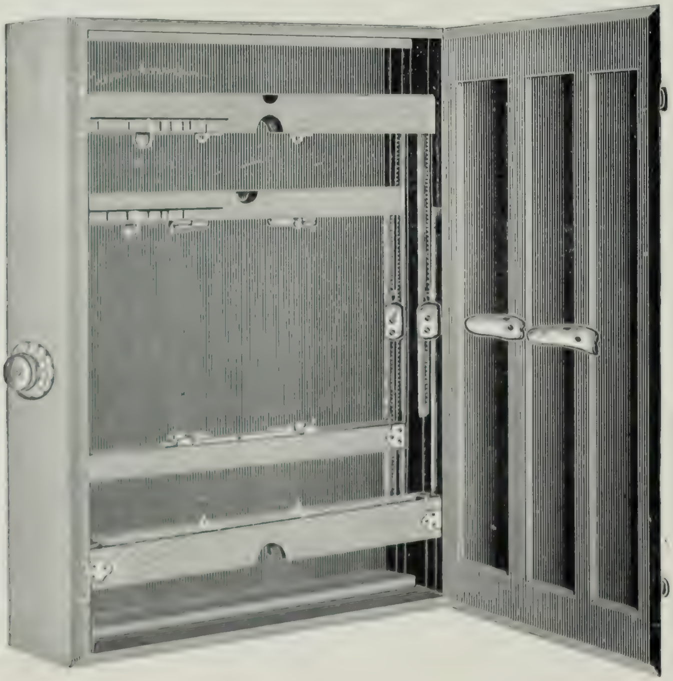
ARTIFICIAL asphaltum is the latest product from the waste of petroleum, known as acid sludge. The process of making it has been patented by Richard Dean, of Cleveland, O.

In Salt Lake City they cut slabs of onyx type high, photograph on it and etch it with nitric acid, as in zinc etching, only they roll up between bitings instead of powdering. The work is not fine enough to be used for other than decorative purposes.

NEW APPARATUS FOR PHOTO-ENGRAVERS.

The two most important pieces of apparatus, after the lens and camera, are the plate-holder and printing frame. Herewith are shown new designs that will interest all photo-engravers. The cuts show their novel features so well that a description of them would appear unnecessary. In the printing frame the utmost strength is combined with the least weight. The clutches and hinges, the first parts to give out, are here made the strongest ever put on a printing frame. By using strips of pure india rubber ¼ inch thick between the inch-thick plate glass used, and the ledges around the inside of the frame, there will be no danger of breaking the glass. The handles on the iron screws give such a purchase that any degree of pressure can be obtained.





The plate-holder is made on the Benster principle, by which the sensitive plate, no matter what size, is brought automatically to the exact center of the holder. Side gauges prevent it getting out of center laterally. The distance between the plate and screen is regulated from the outside of the camera by two knobs. Indicators tell the exact separation. The metal portions touched by the wet plate are unacted upon by the wet plate, while there is a bottle in the lower bar to catch the drippings of nitrate of silver solution. Circulars and prices of both holder and printing frame can be had by addressing our publishers.

PHOTO-LITHOGRAPHY BY DIRECT TRANSFER.

IT is universally admitted that the direct transfer methods have not only the advantage of lessening labor, but also that the sharpness and purity of the final result are essentially greater. Nothing proves this better than the present state of the copper and zinc half-tone process, when compared with that of former times, when the indirect transfer of chromated gelatine prints was the method employed. While engaged last year in working out a practical, direct transfer method for zinc, with the intention of making the first etching directly upon the developed picture, the idea struck me that it was desirable to search for a direct transfer process for stone.

It is not necessary that the stones for this process should be of the finest quality, but they must be without veins or spots, and the surface must be absolutely level. Before flowing with the light-sensitive substance, it is well to slightly heat the stone or to moisten it with warm water. The light-sensitive preparation consists of 3 ounces of good glue, which has been soaked for twelve hours in 20 ounces of water, and then melted on a water bath, and a solution of 1½ drams egg-albumen in 2 ounces of water, which is added to the glue solution, and then filtered.

To 2 ounces of this solution 17 ounces of water and 1½ drams of a 10 per cent. solution of ammonium bichromate are added, and the whole is filtered. This is, in principle, the same preparation that I use for the enamel process on copper and the chromated glue process on zinc, except that here I use more water because of the greater porosity of the stone. With this solution the stone is flowed in the darkroom, and the stone is rotated until the preparation has become dry. The negative is fastened to the stone by means of the ordinary carpenter's clamps, these being much more suitable for this purpose than printing frames. The time of printing in the sun is from one-half to two minutes, and, in the shade, from five to ten minutes, according to the negative. In this state the picture is not yet visible on the stone. I had some difficulty in fixing the picture on the stone and providing it with color to put it into condition for printing. After many experiments I coated the stone, before developing, with a fatty ink, and had satisfactory results. The ink, which I use, consists of Venice turpentine, 20 parts; fatty printing ink, 20 parts; asphaltum, 5 parts, and yellow wax, 3 parts. These are melted and diluted with turpentine to the consistency of syrup. Some photo-litho ink, with an addition of asphaltum solution, was just as serviceable. This fatty ink is rubbed into the stone, before developing, with a soft rag, and the stone is then placed in water. After an hour, the unprinted parts will commence to strip, and the picture may now be fully developed with a cotton tuft. The stone is then gummed, left to dry, and then lightly etched. The picture now adheres firmly to the stone, can be washed, etched and submitted to all manipulations without injury. Proofs from a stone thus prepared are much better than those from indirect transfers.

G. Fritz,
Translated by
Henry Dietrich.

BENZOLE AND BENZINE.

THE frequent application of benzole and benzine in photography, and particularly in the photo-reproduction processes, and the inconvenience and trouble caused by mistaking one for the other, make it desirable to point out a method by which they may be readily distinguished. Anthracite-benzine or benzole is colored carmine-red by the addition of a small crystal of iodine, whereas petroleum-benzine or benzine is colored violet. This reaction is very reliable.

Another simple and certain method for distinguishing benzine and benzole is by means of alcohol. Benzole to which alcohol has been added becomes cloudy when shaken, while benzine remains clear. To demonstrate this, pour a few drops of 95 per cent. alcohol into a glass beaker and then pour out, so that only a very small quantity of alcohol remains. Add a dram of the benzine and shake well. A dark and milky liquid will indicate benzole, while an aqueous light liquid, from which heavy liquid particles separate, will show the presence of benzine.

A. Lainer.

AMERICAN PROCESS YEAR BOOK.

BY no means the least interesting feature in "The International Annual and American Process Year Book" is the three-color print made by the phusochrome process. The original is a print by Mr. E. Tanenbaum, which has been skillfully colored, and the reproduction is an exact copy of the colored photograph. Fifty half-tone engravings by prominent concerns in this country make the book of particular value as a record of the state of perfection to which the art of photo-reproduction has been brought in this country. Oscar E. Binner's article on "The Business End of Photo-Engraving" will appeal to all readers who are engravers.

William Gamble treats on the making of half-tones direct from Nature, and H. Woodbury Shaylor's article on timing exposures contains a hint that will probably find adoption in many shops.

Our Reviewer.

School of Practical Process Engraving.

From Japan we receive the *Shiyashin Geppoh*, a monthly report of the progress of photography, published by R. Konishi, illustrated by a half-tone made by our friend, Itaro Tanaka, who our readers will remember by the blocks reproduced in previous issues of the Bulletin. The *Shashin-Sowa*, edited by Y. Isawa, has reached its fifth volume. This monthly contains several well-printed half-tones and has an English section, part of which is devoted to an English-Japanese dictionary of photography.

The Printing Times and Lithograper is an excellently illustrated monthly, printed and published by Lewis Hepworth & Co., Limited, Tunbridge Wells, England. The August issue contains the gist of all important matter published during the preceding month.

It is announced that, beginning with the first issue of 1897, *The Practical Photographer* will be run on a somewhat different policy, more space and attention being given to the illustrative side. The policy is outlined in the following sentences, extracted from the editor's announcement: "A high-class photographic magazine ought to exhibit the best of which the art is capable, and a graphic art, above all, can only be adequately represented by pictures, and not by letterpress alone. It is just this position that it is proposed *The Practical Photographer* shall endeavor to fill." We wish our English cousin every possible success and tender congratulations on past successes.

We have to thank Mr. F. J. Dale, of Hawaii, for five interesting photographs, submitted for criticism. All are of high quality. We hope to induce Mr. Dale to favor us with a short illustrated article on the state of photography in the Hawaiian Islands.

W. H Curtis sends in several prints that are of much merit. One, "Little Jim," that we have reproduced, is a flash-light, and will serve as a reminder that the flash-light season is now here.

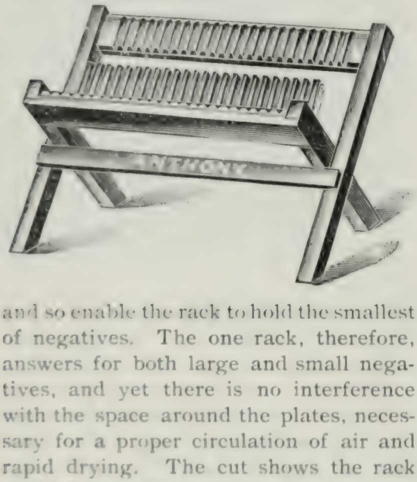
Little Jim.

At the twenty-fifth convention of the Deutschen Photographen-Vereines, held August, 1896, at the City of Trier, Germany, the following awards were made to American exhibitors: Silver medals to Rösch, St. Louis; Pirie MacDonald, Albany; J. C. Strauss, St. Louis; C. M. Hayes, Detroit; W. J. Root, Chicago; John Rösch, White Plains; Gilbert & Bacon, Philadelphia, and A. M. Camp, Jamestown. Bronze medals to Dana, New York, and A. L. Bowersox, Dayton.

The well-known firm of lens makers, Messrs. Taylor, Taylor & Hobson, announce a dissolution of partnership. All accounts will be settled by Thomas Smithies Taylor and William Taylor, will continue to carry on the business. The firm will still have the assistance of W. S. Hobson, who has hitherto represented them.

FROM Penrose & Company, of London, England, we receive the first two numbers of the "Penrose Pocket Books." No. 1 is entitled the "Half-Tone Process," and measures 3½ x 2 inches. Several useful tables and many valuable hints are given in the forty-three pages. No. 2 is a "Ready Reckoner for Process Workers," and consists of twenty-four pages of tables for calculating the number of square inches in blocks. This latter is an exceedingly useful little book.

OF considerable value to the lantern-slide maker is the new Duplex Negative Rack. This is constructed on the same principle as the ordinary negative drying rack, with, however, a supplementary piece that can be moved into position and so enable the rack to hold the smallest of negatives. The one rack, therefore, answers for both large and small negatives, and yet there is no interference with the space around the plates, necessary for a proper circulation of air and rapid drying. The cut shows the rack ready for lantern slide plates.



Röntgen Rays and Phenomena of the Cathode, by Edward P. Thompson, with final chapter by Professor William Anthony. This is, in our estimation, by far the best and most exhaustive work published on this fascinating subject. The author goes back to Faraday's experiments, and leads the reader through a most interesting line of research to the present day. We hope to make further allusion to this book at an early date. It is copiously illustrated with some forty-five half-tones and sixty diagrams.

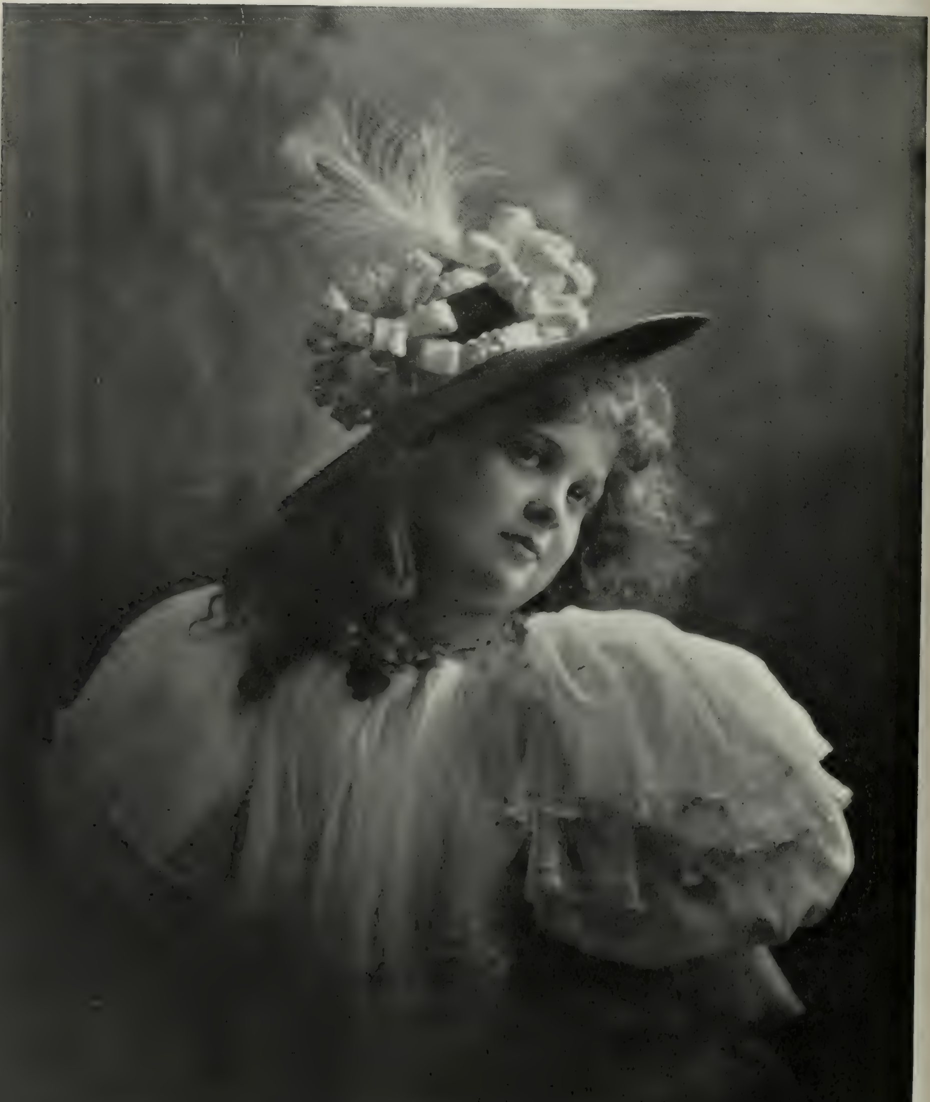
JUST at the moment of going to press we hear from the Secretary of the Indiana Association of Progressive Photographers, Mr. C. R. Reeves, Anderson, Ind. The third annual convention will be held at Indianapolis on March 2d to 5th, inclusive, and a large number of prizes are offered. We note an "employees' class, three cabinets from negatives, unretouched, and three cabinets from same negatives retouched. First prize, silver medal; second prize, bronze medal.'

Kohn's Color Guide for printers, engravers, lithographers, artists and schools is a valuable publication that must have entailed no little work in its production. All interested in color and its reproduction should possess a copy of this work. At the same time we received a chart for matching any two colors; of particular use to those using colored materials. Published by A. Kohn, corner 7th and Chestnut streets, Philadelphia, Pa.

Photograms of '96. This, the second annual published by *The Photogram*, Limited, is a pictorial and literary record of the best work of the year. Technical progress during the past year forms the subject of the first article; radiography, thermography, psychography and color photography being dealt with. Photography in England, the United States, Canada and Australia is discussed by competent writers, and the "Great Exhibitions" are the subject of an extended article by Gleeson White. The book is admirably illustrated.

SEVERAL enquiries have been addressed to us regarding Mr. C. Hetherington's book, "Studies from Leading Studios," which is now in the press. From the glimpse we have had of the proof sheets we can say that it will be of immense value, not only to the proprietors of galleries, but to operators, printers and retouchers. Mr. Hetherington is known the country over as probably the best all-round man in the profession, and in the book that will bear his name will be found hundreds of useful hints. The book will be sold by subscription only, at $3.50, and will be ready on or about December 10th, just in time to answer as a useful and handsome Christmas present. Orders should be given to the nearest dealer in photographic supplies.

OUR readers can help us considerably at this time of the year by recommending the BULLETIN to their photographic friends. We shall endeavor in 1897 to present a magazine equal if not superior to that we have issued in 1896.



GRAVED BY A. C. AUSTIN ENGRAVING CO.

STUDY BY PIRIE MacDONALD.

ANTHONY'S

Photographic Bulletin.

EDITORS:

PROF. CHARLES F. CHANDLER, PH.D., LL.D.
FREDERICK J. HARRISON.

VOL. XXVII. DECEMBER, 1896. NO. 12.

ELEMENTARY PAPERS—BROMIDE PRINTING.

THE period when the amateur photographer turns his thoughts in the direction of evening work is upon us. There is really no reason why such photographic processes as lantern slide and transparency making, and the production of prints by artificial light, should be confined to the season in which long evenings are a characteristic; but it seems to be a fact that, in the summer time, other attractions predominate, and that winter is the season when activity in lantern matters and similar processes is most apparent. To many of our readers the bromide process is familiar, but, from recent correspondence, we find that there are some who are not posted on the details of this most interesting of printing methods. This is a capital time to become familiar with printing on paper by artificial light, for the early disappearance of the sun makes it an easy matter to sufficiently darken the ordinary room without having recourse to black screens and similar devices. The photographer will hardly attempt to make the bromide paper for himself. It has been on the market for many years, and is to-day a highly perfect product, capable of giving, with proper care and a proper understanding of the method of working it, results that cannot fail to please, and permitting of the obtaining of prints without dependence on daylight. The photographer is not confined to one kind of surface or to one weight of paper, for rough and smooth, enameled and unenameled, light and heavy, bromide, or argentic, papers may be found in the market. The general treatment of all is similar.

Bromide paper, it must be borne in mind, is extremely sensitive to light, and all the precautions that are observed in the manipulation of

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slow plates must be adopted when using it. The package containing it must be opened by red light, and must be closed up carefully, or placed in a light-tight box, before any actinic light is admitted to the room. On removing a sheet from a package of this paper, the first trouble may be in recognizing the sensitive side. With the enameled papers there is, of course, no difficulty, but with the rough and light smooth papers, it is difficult to distinguish by the eye one side from the other. If, however, the paper is laid on the table, it will curl slightly, and the inner side of the curled paper is the sensitive side. Or a corner of the paper may be pressed between the moistened finger and thumb, when the coated sensitive side will adhere, while the uncoated side will not. The latter method has, of course, the drawback that a portion of the paper is spoiled more or less. Care should be taken that the sensitive side is preserved from contact with the hands, and, indeed, the package of paper should be kept in an old dry-plate box, so as to be free from dust and from pressure, either in the shape of directly applied force, such as the placing of a heavy weight on the package, or the sliding of one sheet over the edge of another. These are small points, but their observance will prevent the appearance of unaccountable spots and lines.

The negative is placed in the printing frame and the room darkened, the filling of the frame being accomplished by red light. The negative is dusted, and also the paper, the brush being a soft camel's-hair duster, free from stiff hairs, or a velvet pad. The paper is laid in the frame, with its sensitive surface next to the film on the plate, a pad of felt or paper is placed on the bromide paper, the back of the frame is adjusted, and all is ready for the exposure.

The exact time of exposure it is, of course, impossible to give. This will depend on the source of light, the distance from that source, the negative and the brand of paper. Those who contemplate making large quantities of bromide prints can fix up a source of illumination that can be duplicated at any time, and can obtain by experiment the correct exposure for a certain distance on a particular brand of paper for a standard negative, and will for future exposures with other plates make a comparison, and thus arrive at practically the correct exposure. For ordinary purposes the amateur should cut off a strip of paper and make a trial exposure. One trial will usually suffice to furnish the key to the proper time to be given. It must, however, be remembered that the distance that the frame is held from the source of light must be carefully noted. Daylight is not to be recommended for the printing of bromide paper, for it is constantly changing, and its actual actinic power cannot easily be correctly estimated.

Having the paper in the frame, the gas is turned up, or the frame is placed under the coat, or covered up, while the source of illumination is prepared. This, of course, may be electric light, gas, oil, or even candle. The exposure is then made, some twenty seconds, perhaps, being given at a distance of 2 feet from an ordinary gas burner. The light is then extinguished or turned down to the "blue," and the paper removed from the frame. Nothing will be visible, the image

WEARY WALKER'S RETREAT.

Photograph by H. Brown.
Engraved by Albany Engraving Co.

being latent, as in the case of an exposed sensitive plate. The paper is now ready for development. It is laid in a tray and soaked in water. This is advisable, for the paper curls somewhat when wetted, and, if the first wetting is accomplished with the developer, there is danger that part of the paper may be out of the liquid, or that handling may be necessary to keep it immersed. There is also some danger that the developer may not cover the whole paper sufficiently quickly, and in such a case there will be irregular patches of under-developed image. By a preliminary wetting these possibilities of defect are avoided.

As regards the developer to be used, it is safe to say that any developer that may be used on plates may be used on bromide paper. However, care must be taken that a developer that will stain shall not be employed, for staining, while perhaps desirable in negatives, is wholly objectionable in prints. Ferrous oxalate, metacarbol, eikonogen or hydroquinone are eminently suitable. With the packages of paper sold on the market, formulas for ferrous oxalate developer are usually given, of which the following is a type :

Developer.

A.

Potassium oxalate	8 ounces.
Hot water	24 "

Make acid with acetic acid.

B.

Sulphate of iron	8 ounces.
Sulphuric acid	10 minims.
Hot water	16 ounces.

C.

Potassium bromide	1 ounce.
Water	32 ounces.

To develop, take 3 ounces of A, ½ ounce of B, and 10 minims of C.

Clearing Solution.

Acetic acid	1 dram.
Water	1 quart.

There is no doubt but that this is a really efficient developer, and it may be confidently recommended. It is inexpensive, easily prepared, and yields prints of fine, velvety color. The print, being soaked in water, is flooded with developer and the tray rocked. The image quickly appears and gains rapidly in strength. The precise moment for removal from the developer it is fairly easy to perceive, and the print should then be immersed, without washing, in the diluted acetic acid given above, under the heading of Clearing Solution. Or the developer may be poured off into a graduate, and the print flooded with the acetic acid in the developing tray. After some few minutes' soaking in the acid, this should be poured off and a fresh lot of acid applied.

The print is then well rinsed in water, and fixed in a solution of hyposulphite of soda solution :

Hyposulphite of soda	1 ounce.
Water	5 ounces.

With the other developers mentioned above, the acid bath is dispensed with. There is, however, a tendency to staining, if the developer is at all old, and, for large work especially, the ferrous oxalate developer is to be preferred. The process of development as detailed above may seem somewhat tedious, and yet it is extremely simple, involving no more processes than the toning and fixing of printing-out papers, and permitting of the obtaining of prints at night.

A further advantage of bromide paper is, that with it prints may be made from wet negatives. The negative being well washed to ensure complete removal of hypo, the bromide paper is well soaked in water and squeegeed into contact with the negative. The process is then identical with that given above. Printing-out papers certainly permit of more dodging during the printing, and doubtless render the half-tones much more faithfully, but bromide paper deserves far more attention at the hands of amateurs than it has hitherto received.

FRAMES.

AT the recent convention of the Photographers' Association of America some of the exhibits attracted considerable attention because of the excellent taste displayed in the framing, while others did not escape comment for the lack of taste and judgment shown in this important feature. Mr. Eustace Calland, in the *Amateur Photographer* (Eng.), gives some useful information that may well receive the consideration of intending exhibitors.

It should be recollected that a frame has usually a twofold purpose —to dissociate the picture in some measure from its surroundings, so that we may enjoy it the more uninterruptedly, and to enhance its beauty and character by such decorative features as shall close the rhythm of the whole without undue harshness when the eye wanders to the margin. The nearer the approach to realism, the more complete must be the separation from the surrounding space ; the more abstract our treatment of Nature, the more freedom will follow for decorative fancy in the setting.

Some of the character of the picture may be allowed to stray out into its border. The theme, let us say, is Nature in a high key, streaming sunlight, crisp alternations of sunny spaces and shadow spaces, a sense of movement and vibration. Then let us break up the surface of our frame in like fashion, avoiding long and parallel lines of light and shadow, symbolic of repose. Or where simple masses are in relation, where quietude, stillness, stability of conditions are to be felt, then the lines of the frame should be simple and continuous, the hollows throwing broad bands of shadow. Flat frames are adapted to pictures in which the planes are limited. Deep mounts and deep frames are devices to lead the eye into the picture, to assist roundness and perspective. The spacing at the top and bottom may be unequal. It is a common practice in the case of mounts to leave more distance beneath the print than above, but the principle may be extended to frames or panels of wood, giving an asymmetrical arrangement that yields pleasure, perhaps because it is a tendency towards instability, a less pronounced geometrical balance.

The mottles and streaks of some woods used in the natural state will obviously fulfill the conditions of surface variety and emphasis of lines supplied by added ornament to plainer forms. It may on occasion be agreeable to augment the significance of parallel lines in a picture by similar lines in the frame running in the same rather than a "correcting" direction.

Whatever is done, however, must be done with exceeding reticence and lightness of hand. Whether diversity of surface is sought in inlay, in *gesso*, in natural markings or incised ornament, it must be remembered that we are dealing with an art in which the characteristics of salient line or rounded form are never strongly marked as they may be in hand work ; the echo, in other words, must be of the faintest.

Decision on the tone of a frame, if it is to be higher or lower than the surrounded picture, is a point equally as important as the color. A single trial quickly teaches the veriest beginner that a print that is right on a dark mount is much too dark for a light one. A dark surrounding is a powerful aid in conveying the feeling of daylight and sunshine in a landscape, while in some instances a frame lighter than the ground of the print will strike us as admissible and pleasing, the picture being usually a composition whose decorative qualities we wish to appeal. The color may seldom be pure white ; a creamy or ochreous white is better, and will mate well with sepia and carbon red. A critic lately has somewhat jeered at the approximation of style that he alleges is taking place in exhibition frames. Who originated the idea of empaneling the photograph in dark stained wood, I do not know; the fact remains that it is accepted by general consent as best fulfilling the requirements. The colors, which with more powerful pictures might be more pronounced, are indescribable blendings of gray, umber, green and soft black ; the dark tones do not betray the absence of light that is a notorious fault in photographs. The shapes in vogue are simple, and do not attract undue attention.

Mr. Hollyer perhaps first popularized the style when he surrounded his pre-Raphaelite reproductions with a margin of green-stained wood. Before leaving the subject of color, it will be well to allude to the importance of trying effects with the unavoidable glass over the picture before being satisfied as to the harmony betwixt print and frame. Remember the print is under glass and the frame is not. Patent plate is as great an offender as the best ordinary sheet in the matter of color, but glazing is indispensable, in the dirt-laden atmosphere of large towns anyway. Inattention to this seeming trifle may cause an unpleasant surprise, perhaps on the eve of sending to an exhibition.

The difficulty of describing to the frame-maker the color required tends to send people to the few men who have color-patterns in stock. It is an advantage to do the staining one's self, an easy matter with Stephens' stains, which afford good colors, or the receipts in Spon's hand-books; logwood, indigo, potassium bichromate, liquid ammonia for darkening oak, pearlash and other alkalies may be pressed into service, and a rub with wax polish forms the best finish. A pleasant effect for a light frame is obtained by coating the smooth wood with a distemper of gilder's whiting and size, slightly tinted with ochre. Gilding has also been easily made with transfer gold.

To the Editors of the Photographic BULLETIN :

DEAR SIRS,—The discussion of the Röntgen phenomena by the British Association developed, among other things, an erroneous statement. The wide reputation of the person making the statement in question has given the remark general circulation in the lay and technical press.

Following remarks on hyper-phosphorescence, the statement was added that probably insects having lensless eyes were able to visualize by means of Röntgen rays. The reference here is evidently to the fixed or multiple-facet eye of insects.

The writer has in his possession a most interesting lantern slide, made by Dr. G. F. Allen, of Aurora, Ill. The eye of a beetle was placed in the camera as a substitute for the ordinary lens, and an exposure made on the black profile of a head on a white background. The resulting multigraph was circular and contained several hundred distinct images of the profile, one, indeed, for each facet in the eye. The "Gem" camera employed for taking a large number of simultaneous photographs of an object is the physical analogue of such an eye. The relation of such an eye to that of the mammals is that of the fixed focus camera to one in which the focus is adjustable.

It seems reasonably clear that insects form their judgments of distance from such multiple images, depending upon the power of each facet to refract light rays. It is scarcely conceivable that rays not capable of refraction, or of being focused, can by simple shadow effects enable a judgment as to the distance of an object to be formed.

Very truly yours,

W. M. STINE.

ARMOUR INSTITUTE OF TECHNOLOGY,
October 27, 1896.

"THE International Annual and American Process Year Book" for 1897 has met with much favor, and the greater part of the edition has been sold. The frontispiece, an actual photograph, is interesting by reason of the use of a stipple plate in front of the sensitive plate when the exposure was made. The very delicate stipple is only visible on close examination and enhances the general appearance of the picture. The many photo-engravings will serve as object lessons in lighting and general treatment.

Items of Interest

AN international exhibition will be held in 1897 in Brisbane, Queensland, Australia. Among the points interesting to photographers we note that "photo passes" will be issued to those whose exhibits need daily personal attention. Photographs are listed as Class 7 of Group I (Fine Arts), and under chemistry, physics and philosophical instruments we find: "Photographic apparatus, processes, gelatine, bromide, plate-making, printing processes, silver, carbon, Woodburytype, platinotype, etc., cameras, shutters, changing boxes, slides, tents, lamps, etc.

◆

WITH much regret we record the death of Mr. James R. Pearson, of Pittsburgh, who died suddenly while at a wedding party. He was a well-known figure at the conventions.

◆

DO not blame all cases of lack of permanency of prints to insufficient washing. Sometimes insufficient fixing is the cause, and this, of course, cannot be remedied by washing. Better leave prints five minutes longer than necessary in the hypo bath than have them unfixed.

◆

IF you have an odd moment to spare, look at the shelves on which your negatives are stored. Screws and brackets may be loose, and a little tinkering may save disaster.

◆

FROM an interesting series of articles by J. A. Randall in the *Photographic News*, we cull the following method for producing "pictures in vapor."

John Harmer introduced this process, by means of which, upon breathing or causing moisture to condense upon a collodion film, an image, before invisible, comes into sight. The method is based on the carbon process for making transparencies. In choosing the tissue, if the negative is a dense one, the ordinary tissue used for transparencies will do; but if the negative be weaker in character, it will be well to use a tissue not so loaded with coloring matter. The bichromate bath should not be stronger than 5 per cent. In making the tissue sensitive, all the conditions for producing vigorous and brilliant transparencies, such as short immersion in the solution, squeegeeing off, quick drying, and speedy use, must be observed. A condition of solubility excessive for ordinary work will, in the present case, be found favorable. Expose as for a lantern transparency, and on taking the tissue from the frame, collodionize it in the usual way with a collodion composed of 5 grains of pyroxyline dissolved in an ounce of a mixture of equal parts of methylated spirit and methylated ether. Allow to partially dry. A clean glass is next taken and coated from the same collodion, then washed in clean cold water until the greasiness has disappeared, when it is ready to receive the tissue. The tissue may now be plunged into the water and left for a minute or so, but not till it begins to curl outwards, or the powers of absorption will have gone too far to the detriment of the final vapor picture. When ready, the glass and tissue upon it are lifted out of the water, squeegeed in the usual way, covered with two or three folds of blotting paper, and placed under a weight for an hour or more, after which the glass is taken and stripped, the tissue being pulled away from the layer of collodion. It is then put aside to dry. That the layer of collodion on the tissue should not be too horny or dried too much, nor the tissue allowed to absorb too much water, are all important points. When the plate is quite dry its surface will have a glassy appearance, which will not exhibit any peculiarity until a little moisture is condensed upon it ; then it will be found that the film is capable of disposing of what, on a clean plate of glass, would be an even layer of fog in such a way that a picture containing the most delicate gradations is visible. The image disappears as the moisture evaporates, and reappears when subjected to its influence.

In the *American Journal of Science*, Prof. Ogden N. Rood details his experiments on the regular or specular reflection of the Röntgen rays from polished metallic surfaces. The first experiment with a sheet of platinum foil as the reflecting surface was described in the April issue of the Bulletin. The experiment showed that platinum foil at an angle of 45 degrees reflected $\frac{1}{260}$ part of the incident X rays. Further experiments were made with a flat mirror of speculum metal, at the same angle, and less reflecting power was evident. Other experiments were made with a flat platinum mirror, and with a cylindrical mirror made of lead foil faced with a thin coating of tin. The results showed that, "metallic surfaces which are highly polished for ordinary light are only imperfectly polished for the X rays, and it may be added that all the experiments detailed in this paper are in harmony with the idea that the X rays consist of transverse waves like those that constitute ordinary light, differing from them only in being much shorter."

STUDY BY F. M. SOMERS.

Engraved by J. Manz & Co., Chicago.

STRAUSS, of St. Louis, is said to make double exposures on the one plate, the first being of the subject proper, and the second of a piece of rough canvas, painted olive green. When the plate is developed, the canvas effect will show throughout the picture, giving the appearance of a photograph on canvas.

* * *

WE have in previous issues alluded to the yellowing of platinotype prints, due to the presence of small quantities of iron which are not removed by hydrochloric acid. It is said that if the prints are immersed in a solution of ammonium tartrate—made by adding to a 5 per cent. solution of tartaric acid sufficient ammonia to make it smell strongly—and then well washed, the whole of the iron may be eliminated.

* * *

MUCH is written regarding the permanency of sepia, brown, green, and other colored lantern slides, and the making of such slides is deprecated by several writers. The permanency of a print should be assured, but, in the case of a lantern slide, permanency may give way to expediency. A print is liable to get out of the owner's possession, but lantern slides are seldom given away. If a more desirable effect is obtained from a toned lantern slide, its production is justifiable, and, indeed, to be recommended, provided, of course, that the slide is kept in the possession of the maker.

* * *

A successful application of photography to matters legal is reported in *The Amateur Photographer* (Eng.). A sub-contractor, who was working on a building, wishing to draw 700 marks on account, made out a receipt for this sum in expectation of receiving it. His employer, however, paid him only 500 marks, and the receipt was changed in pencil, no ink being available. The holder of the receipt altered it by rubbing out the pencil marks, claiming to have paid the 700 marks. Dr. Jeserich photographed the receipt, obtaining clear evidence of the alterations made with the pencil, and subsequently erased. The German court considered this satisfactory confirmation of the verbal evidence.

* * *

FOR X-ray work it is best to have the sensitive plates as closely as possible to the subjects. This is best accomplished by placing them in light-tight paper bags after the method recommended by Carbutt.

* * *

CHRISTMAS cards, especially adapted for the use of photographers, may be obtained from all dealers in photo supplies. These afford a welcome change from the usual lithographed card, and admit of the presentation of some of the sender's own work.

* * *

ONCE more we would emphasize the necessity for care in the selection of card mounts. Price is by no means the only consideration to be taken into account by the photographer. All the care expended on the print is so much time wasted if the mounts contain hypo. Mottled prints are an eyesore, and it is very discouraging and annoying to waste a whole batch of prints as a result of parsimony in the matter of mounts. Only those made by a reputable manufacturer should be used.

* * *

INVESTIGATIONS made by Dr. Heffter, of Germany, tend to show that sulphocyanide salts are not so poisonous as has been thought. He swallowed ½ grain, and on the following day 1 grain, without any evil effect.

* * *

PALLADIUM salts will produce a very fine sepia tone on matt-surface papers. Fifteen grains of palladium bichloride are dissolved in 3½ ounces of water, and 1½ drams of muriatic acid added. The pictures are well washed after printing, and the toning solution is applied with a cotton tuft. The prints are finally fixed in a weak alkaline hypo bath.

* * *

A YELLOW screen, made by tacking yellow fabric on a framework of wood, is a useful adjunct in the darkroom. It should be placed in front of the ruby lamp during the loading of plate and roll holders, and is also useful during development. Many cases of fogged plates and films are directly traceable to prolonged exposure to the light of the red lamp during the filling of holders.

* * *

MANY cases of most decided under-exposure have been brought to our notice recently. Allowance must be made for the time of year and a perusal of the exposure tables at the back of the Annual will result in fewer failures. In one instance a whole roll of 5 x 7 film had been exposed. Enquiry showed that all the exposures had been made after four o'clock, with a small stop, and a lens that was far from clean. A clean lens, a larger stop, more careful attention to the lighting of the subject and a slower shutter would have improved matters. But it must be borne in mind that the camera has its limitations, and that there are many occasions when it is well that the only picture made of the subject should be a mental one.

* * *

CARBON actinometers are used in the New York schools to determine at regular intervals whether there is sufficient daylight for school purposes.

* * *

"THE photographer-artist is a commander operating at manœuvres where outside influences and exigencies limit his discretion, curtail his opportunities and circumscribe his sphere. All the same, as time passes, the photographer-artist is becoming more and more the master in the literal sense. He can command, even if within a small area. He is not entirely under the domination of his camera and chemicals. Pictures were wont to be taken, and frames found afterwards to fit them. A print from a fogged negative would figure under the title of 'A Misty Morning.' Now-a-days it is not unusual to conceive a theme, and forthwith seek a subject to fit it, and the man who sets forth to find one, hoping that photography will prove a willing exponent of his thoughts and imagination, is not of necessity doomed to utter disaster and complete disappointment."—H. E. MURCHISON.

* * *

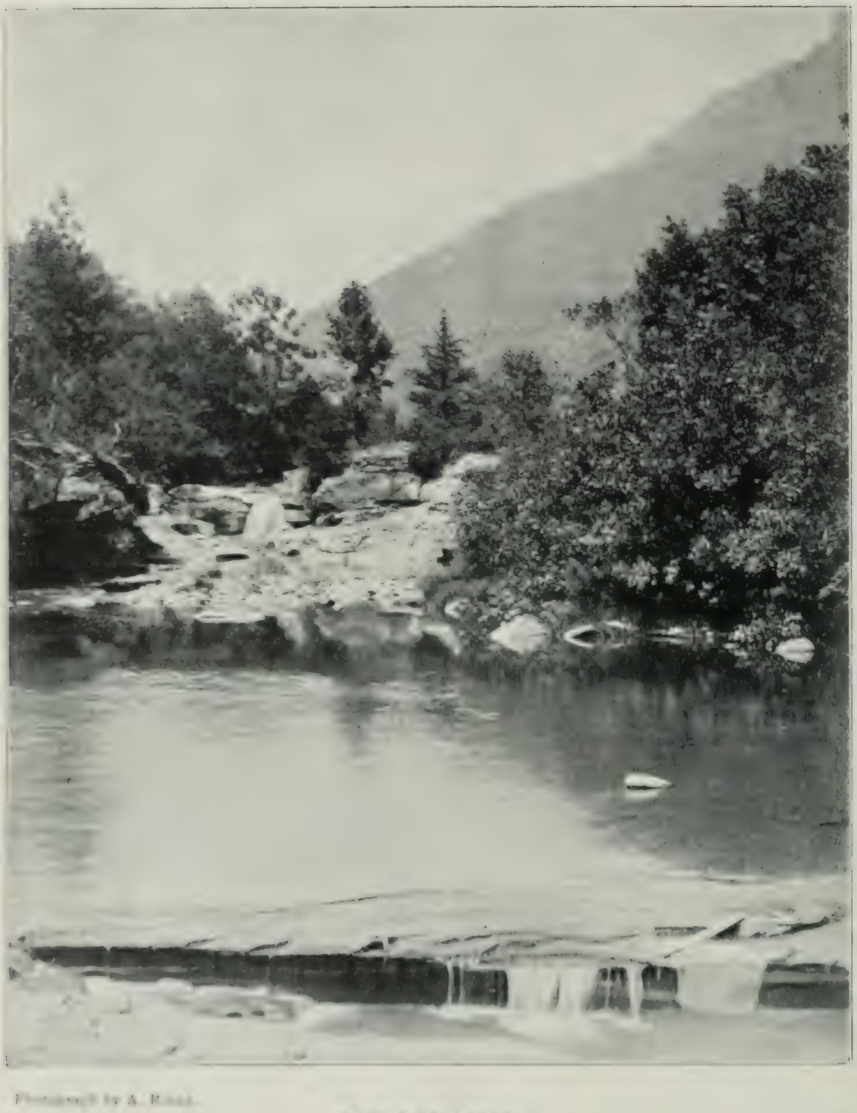
METACARBOL is finding much favor among photographers, amateur and professional. Those who prefer to use ready mixed-developer may now purchase metacarbol, in 8 and 16-ounce bottles, all ready for use. Our publishers express their willingness to send a sample package of metacarbol to all who desire to test it.

* * *

IN the BULLETIN for 1897 we hope to introduce three features that should prove acceptable to our readers. Recognizing that many of our subscribers are beginners, we shall, in each issue, present a paper on elementary work, giving practical details for working the various simpler processes. We shall also endeavor to publish in each number an account of some experimental work, in the hope that our readers may be tempted to repeat it and send in their results. Half-tone and zinc etching should occupy some share of the amateur's attention, and a series of papers of an elementary character will be given bearing on the photo-reproduction processes.

* * *

THE many users of the American aristotype products will be interested in learning that the manufacturers have placed on the market "Amateur Gold," 50 cents, and "Amateur Platinum," 50 cents. Some have hitherto hesitated paying $2 for chemicals, but the new article brings the price within reach of everyone. This is a particular advantage, for pure chemicals are a necessity for good work.



Photograph by A. [illegible]

IN THE CATSKILLS

ENLARGED NEGATIVES.

REFERRING to the article on enlarging, written by Mr. George Rockwood for the BULLETIN, in which it was recommended that, instead of making the transparency of the size of the original negative, and from that making an enlarged negative, an enlarged transparency should be made, and from this the negative, Mr. W. K. Burton* says :

"The advantages, apart from the question of cost, are unmistakable, but when hand work has to be done to improve the results or remove defects, the advantages are very great indeed. To take a single example : There is nothing much more offensive than the regular stipple of the professional retoucher—not perceptible in a print the size of the original—when greatly enlarged. If a negative be made purposely for an enlargement, or if a professional photographer, at the time of sitting, gets an order for small prints—say, cabinet size—and an enlargement also, it is far best, apart from cost, to make an enlarged transparency before any retouching is done on the original negative. The transparency and the enlarged negative may then both be retouched with marks of the same size as they will be seen on the final print. The advantages of being able to do this are very great.

"The fact is, that the cost is the only reason why this process should not always be adopted for enlarged negatives, but the cost exists only when the enlarged transparency is made on glass ; but, as a matter of fact, neither it nor the enlarged negative need be made on glass.

"We believe it was Mr. Valentine Blanchard who first (some twenty or twenty-five years ago) made his enlarged negatives on albumenized paper. We believe he had three reasons for so doing. The first, that he considered the slight grain produced by printing through the paper to be an advantage ; second, that the process used in those days being the wet plate, it would be necessary to make with considerable difficulty, or, at least, trouble, special dry plates for the final negatives, so as to be able to obtain contact ; and, third, on account of the saving of cost. We believe Mr. Blanchard waxed the back of the paper to secure translucency and comparative rapidity in printing.

"It is not necessary, however, to use glass, even for the enlarged positive.

"Here is a process that has given very promising results in our hands, and that we believe to have great possibilities in it, in the hands of those capable of improving positives and negatives by bold brush washes. We do not, however, consider it useful except for pretty large work, say 2 feet long or more, because the grain, which we consider an improvement in large work, is too conspicuous in small.

"An enlargement is made on bromide paper in the usual way, but exposing somewhat longer than usual, so that the high-light details come out quite strongly, and using a developer that would give a result distinctly hard were this positive to be the final print. In fact, the shadow details should be somewhat 'blocked up' when seen by reflected light. Slow paper is best, and, indeed, the result we want is that black, harsh positive that one is so liable to get against his will when using this paper.

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* *Photography*, October 22d.

"We now have our positive, and on this we may work with the brush as much as may seem necessary, but it must be borne in mind that as the positive is to be used as a positive transparency, the work must be made darker than appears pleasing to the eye. It would probably be the best arrangement to have the positive stretched so as to be strongly illuminated from the back, the worker working almost in darkness.

"From this positive a negative is made by contact on a second sheet of bromide paper. A printing frame is not necessary. The object of a printing frame is to enable the operator, from time to time, to see a part of his print to enable him to judge how exposure is progressing, or, in the case of photo-mechanical work, to put on the great pressure necessary to bring glass and copper or zinc plates into close contact. In the case of bromide printing there is no visible image to be seen, and, therefore, none to judge of.

"All that is necessary is to provide a perfectly flat board and a sheet of plate glass (or, better, two sheets of plate glass) a little larger than the positive and negative, and to clamp them together at the edges, with the positive and the paper for the negative between.

"Of course, in any establishment where enlarged negatives were regularly made and used, there would be printing frames large enough for making the final prints. The experimental negatives made by us we simply took over to an establishment where we could have the use of gear for producing blue prints.

"There is no need to give any advice about 'finding out the necessary exposure by experiment.' It will be several times as long as if the positive were glass; nor is it necessary to state that, as it is a negative that is being made, it must be made to appear very black by reflected light. The development must, in fact, be exactly as described for the positives.

"The only question now is as to whether the negative should be 'waxed' or not. The process of 'waxing' consists in incorporating with the paper, working from the back, melted wax, the process being assisted by the use of a hot flat iron. There is not space to describe it here. Indeed, though we have worked it, we can scarcely pretend to be able to give instructions in it. It is a troublesome process, liable to failure, except in the hands of those well practiced in it. And, although it considerably shortens the time of exposure, and greatly reduces the grains, we do not recommend any one not really experienced in waxing to attempt it, the more especially as we do not consider the reducing of the grains as advisable.

"As regards exposure in the printing frames for printing-out processes of any kind, it is certainly somewhat long, but then people do not in almost any case wish enlargements turned out in quantities, as in the case of small prints, and it may be remembered that, with the thick paper of the bromide negative, there is no objection to printing in the strongest sunshine."

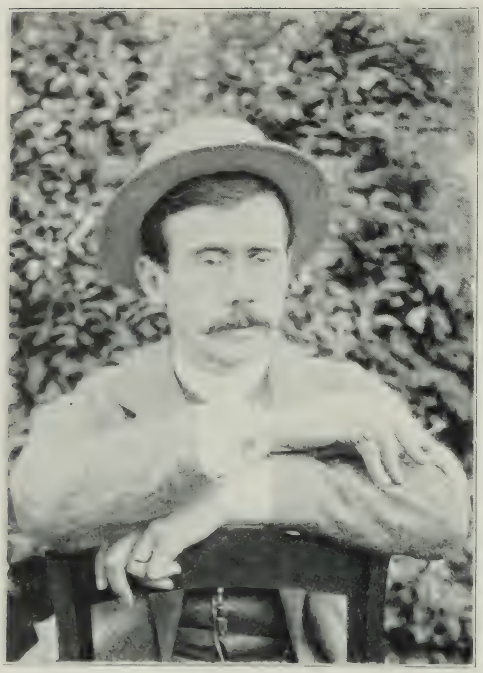
OUTDOOR PORTRAITURE.

IN the October issue of this periodical, reference is made to the growing influence of the outdoor photographer, the versatile genius who does not, like our good old friend Micawber, wait for something to turn up, but looks for business when it fails to come to him.

In the large cities men are beginning to make a specialty of what they are pleased to term non-studio photography. Equipped with a portable flashlight apparatus and a compact camera, they visit the homes of their customers and photograph the latter in familiar surroundings. It is perfectly natural that people should show less constraint under these circumstances than they would in a studio, and hence the resulting photographs give better satisfaction, are more lifelike, and show folk, not as they might be or ought to be, but as they really are in every-day existence.

That this means a decided advance in portrait photography cannot be gainsaid. It is true that some of the leading photographers of this country have learned to pose sitters in a natural and unconstrained manner, but what is true of them does not apply with equal force to the rank and file of the profession, who turn out portraits occasionally that give one the nightmare. Many of these gentlemen are wholly devoid of artistic perceptions, and imagine that, as long as they turn out work that is technically perfect, their customers ought to be satisfied. But the public is being taught gradually to distinguish between artistic and commonplace work, and naturally gives the preference to the former. Ever since the Centennial Exhibition the art taste of the American people has been educated and improved, and consequently

COUNTRY BOYS.



MYSELF.

the individual is more exacting in his demands concerning everything that may be classified as art. He has learned, within the past decade, that photography belongs in this category, and therefore expects more of his photographer to-day than he did of yore. If the latter fails to meet the expectations of his patrons, he naturally loses custom. Photographers who complain of a loss of patronage should stop to think whether, after all, they are not themselves to blame for the decrease in the number of their customers.

The photographer of a great city is apt to purse his lips disdainfully when the work of his itinerant brother is mentioned, and yet some of these wandering camera fiends turn out superior photographs that would do credit to expert craftsmen.

Thus far, outdoor portraiture has been the undisputed province of the amateur photographer, although there is no reason why the country photographer, who is compelled to move from place to place to eke out a livelihood, who must of necessity dispense with the use of a well-lighted and well-appointed studio and content himself with Nature's gallery, and who, moreover, is hampered by a lack of accessories that lend additional charm to a picture, should not essay this kind of work. During the spring, summer, and autumn months Nature furnishes him with a suitable background, namely, foliage; and whenever this is not to be had, which is rarely the case, drapery placed out of focus will do equally well.

The proper lighting of the features will present the most difficulty, but with a little practice, patience, and observation this is easily overcome. It is impossible to make good outdoor portraits in bright sunlight, which causes sitters to scowl, and gives the face an unnatural expression. A position just outside of the direct sunshine is preferable. I have found the forenoon and afternoon better adapted to outdoor portraiture than the middle of the day. Too much top light is objectionable, and must sometimes be shut out by means of screens. Reflectors are seldom required. As regards posture, any pose that looks natural may be assumed. The pose should, so to speak, be adapted to the sitter. The manipulator of the camera is the best judge of the correct attitude. He should beware of routine postures. One sitter may look splendid in a certain pose, but if the next sitter is placed in the same posture he may look ridiculous.

For outdoor portraiture, I prefer a long-focus lens, rapid plates, and a pyro and metol developer.

A word or two, in conclusion, in regard to the illustrations of this article. My own physiognomy was taken instantaneously in bright sunlight, in contradiction to accepted canons, the remainder in the shade. The photograph I have dubbed "Country Boys" is the picture of brothers, though one would not think it, they look so dissimilar. I wanted to "take" them as they were, but their fond mother would not have it that way, but insisted on dressing them up for the occasion, which accounts for the blouses of the same pattern. They are the sons of a German in a Michigan village, where I spent the summer, and as pretty a couple of curly-headed lads as I ever saw.

Dr. Hugo Erichsen.

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The attention of our readers is invited to the picture "In the Catskills," which appears in this issue of the Bulletin. This picture is certainly open to criticism, and we would like to hear from our readers regarding it. Communications should be short and should not deal particularly with this picture, this latter simply serving as an illustration to give point to the remarks. We shall be glad to send the Bulletin for one year to the writers of accepted criticisms.

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Some little delay has unavoidably occurred in the sending out of the contributors' copies of "The International Annual." These, however, are now in such an advanced state that there is every probability that they will be issued on December 1st.

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All communications having reference to the January issue of the Bulletin *should reach us not later than December 20th.*

TONING WET COLLODION TRANSPARENCIES.

THE silver precipitate of the wet collodion plate is a grayish black, when the iron developer is used, and this coloration is not always the most agreeable for diapositives and lantern slides. If pyro developer is applied in place of the ordinary iron developer, a more agreeable bluish black coloration is obtained, which can be changed by toning with neutral chloride of gold, chloride of palladium, etc. But in consequence of the large addition of glacial acetic acid to the pyro developer the time of exposure has to be more than double that necessary when the iron developer is used. An endeavor was, therefore, made to obtain a more pleasing color by toning. The following toning bath was found to be very useful for this purpose :

Chloro-platinite of potassium solution (1 : 50)	68 minims.
Nitric acid	12 drops.
Chloride of gold solution (1 : 50).........	51 minims.
Distilled water	20 ounces.

The plates, after having been fixed in hypo or cyanide of potassium and well washed, are put into the coloring bath while still wet. After one to two minutes the plates will have an agreeable violet-blue to bluish black coloration, which is very suitable for projection pictures.

Dry collodion plates can also be colored in this bath, but the process takes much longer, the horny collodion film rendering the penetration of the liquid very difficult.

A bath consisting of chloro-platinite of potassium (1 : 1,400) acidified with muriatic acid gives a blacker tone.

A mixture of

I.

Ammonium sulphocyanide...............	5½ drams.
Hypo.. ..	8 grains.
Water........................	20 ounces.

II.

Chloride of gold and potassium solution (1 : 150)...........	1 ounce.
Water...	20 ounces.

in equal parts gives a grayish black coloration. The platinum and gold bath mentioned first gives the most pleasing effect.

Th. J. Placzek.
Translated by
Hy. Dietrich.

ERRONEOUS AND CORRECT INTENSIFYING.

WE have two negatives. One is over-exposed, and therefore flat. The other is under-exposed, and has, therefore, not sufficient details in the shadows. Both require intensifying. Most photographers will submit both plates to the same treatment. They are bathed in bichloride of mercury until they are thoroughly bleached, and then they are blackened with ammonia. What is the result? The over-exposed picture will very likely be turned into a normal state, provided the over-exposure was not too strong. But with the under-exposed picture the effect of under-exposure will increase; the shadows will not show any more details, and the high lights will become still more dense, and that is a great defect.

Both kinds of pictures must, therefore, undergo a different treatment. In the latter or under-exposed picture the details in the shadows have to be increased, while the high lights require no intensification. The following process is applicable for this purpose:

If the negative is put into the bichloride of mercury solution, the upper film will bleach first. It will take some time until the whole negative has become white from the reversed side.

If the plate is taken sooner than usual out of this solution, it can be seen from the reversed side that the darkest parts are still black, while the middle tones have bleached out. If the same, after thorough washing, is now flowed with ammonia, only the bleached parts will naturally increase in intensity. The light parts of the negative will, therefore, become much darker in proportion than the others. This is what the under-exposed negatives require to bring them nearer to the character of normally exposed plates—the increase of the details in the shadows. To find the proper time when to cease bleaching, it is well to be fully acquainted with the action taking place.

The black metallic silver, of which the negative consists, being bleached by the bichloride of mercury, chloride of silver and mercurous chloride will form. The mercurous chloride, which is also an insoluble salt, is, with the chloride of silver, in the place originally occupied by the metallic silver. By the action of the ammonia black mercurous ammonium chloride is produced.

The darker parts of the picture are bleached slower by the mercury salt. At these parts the bromide of silver has not only been reduced on the surface, but also deep into the film, and eventually to the glass support. It takes some time before the bichloride of mercury can penetrate this. That this is the case I have observed very distinctly during the intensifying of a few plates which had been exposed from the reversed side. The darkest parts began here to bleach first, because the silver deposit reached to the surface. The bleaching of the half-tones only took place after the bichloride of mercury had penetrated the gelatine film thoroughly.

Originally, intensifying was considered to be an increase of contrasts. Can the above process, then, still be counted as one of the intensifying processes?

Regarding the under-exposed pictures, there is actually only a reduction of the difference between light and shadow. Only the differences of brightness in the shadows are increased.

We are accustomed to designate the treatment of a plate with an intensifier as intensification, but the above has shown that under some circumstances a reduction can take place by the intensifier; and it is possible also that the contrasts of a picture are increased by a reducer, so that the same will have really an intensifying action. To prevent misunderstanding, I would propose the following definition for the two expressions:

The word intensifier should only be applied when the contrasts of the whole picture are to be increased. Otherwise, the part to be intensified should be mentioned; for instance, intensification of the details in the shadows. The word reducing should not signify a flattening of the picture, but a reduction of the density of the silver precipitate, whereby the time of printing is reduced.

A strongly over-exposed negative should be treated exactly the opposite from that of an under-exposed negative. In the latter case there are insufficient details in the shadows. Aside from the intensification of the whole picture, there is also an increase of the details in the high lights. This is reached in the easiest way by first reducing the picture a little, followed by the ordinary bichloride of mercury intensification. As reducer, I apply hyposulphite of soda and some red prussiate of potassium, followed by a thorough washing. In the treatment with bromide of copper and nitrate of silver, the first operation can be left out. The blackening in nitrate of silver may be left out entirely, if the washing was too extended after the bleaching with bromide of copper. If the washing is stopped sooner, any clearing in the shadow parts can be obtained. But this method requires some skill.

J. Raphaels.

Translated by

Hy. Dietrich.

THE THEORY OF DEVELOPMENT.*

IT is not my intention to advocate any particular form of development. I wish to speak entirely theoretically of what takes place during the development of the image. It is a curious state of things that this, one of the most important operations in the practice of photography, has received far less attention, from the chemical point of view, than anything else.

When I started photography we had one developer, gallic acid, which was used in the calotype and waxed paper processes, and there was then some excuse for no theory being advanced as to its action on the sensitive film; but, as time went on, we got pyro and sulphate of iron for physical development, and lately the number of developing agents at our command has been greatly increased by the advent of amidol, metol, etc. Pyro, being that in most general use, will be the one I shall speak of, but the same theory applies to all.

A little light was recently thrown upon one action of pyro by Mr. Haddon, who pointed out that pyro itself exercised no tanning action on gelatine. I will go further, however, and say that there is no tanning action even with oxidized pyro, and might also say that pyro is not a developer. It is a fact in chemistry that any partially oxidized substance is always greedy for further combination with oxygen, and if we notice the construction of pyrogallic acid, which is $C_6H_3(OH)_3$, it will be seen that already three of its atoms are oxidized, and it is, therefore, very suitable for use as a developing agent on this account.

If we take pyrogallic acid and apply it to an exposed plate, what takes place? First, the bromine is liberated wherever light has acted, and it is this liberated bromine and not the pyro, which tans the gelatine. If pyro were a tanning agent, then such a process as Warnerke's, where the plate is developed with pyro, and then placed in hot water when that part upon which light has not acted, and where there

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* London and Provincial Photographic Association

AMONG THE DAISIES.

Photograph and Half-Tone by H. LANEY.

has been no development of an image, is dissolved, would be impossible. I hold the theory that it is the nascent bromine that tans the gelatine.

If a plain gelatine plate is soaked in a solution of pyro and ammonia for several hours, and then put in hot water, it will melt readily, proving that, although subjected to the action of oxidized pyro, no tanning action has taken place. I know that old notions are hard to get rid of, as is the so-called rising and setting of the sun, which is only illusive. Things are not what they seem, and this tanning action, though appearing to be produced by pyrogallic action, is not due to it.

Now, as to the development of the image, what is the constitution of the image in the plate? It has been said that the undeveloped image in the plate consists of silver sub-bromide; but silver sub-bromide has never yet been proved to be present, and there is no evidence that silver sub-bromide has been made, except once by the German chemist, Guntz. It has been assumed that it exists, but no proof can be given. The change to silver sub-bromide, I consider, ought to be visible if existent, and I hold that the phenomenon of development can be accounted for without the supposed change to sub-bromide. In the development of a plate the operations, which are well known, consist in pouring the pyro solution into the dish or vessel containing the plate, when the image gradually appears till sufficient intensity is obtained, when it is stopped by various means, such as plunging in water, etc. What is the action which takes place, and what part of the pyro does the work? Pyro contains three oxidized atoms of hydrogen and three atoms of hydrogen unoxidized and waiting to be oxidized. It is generally thought that the hydrogen of the pyro develops the picture, but it is not so. The plate contains bromide of silver, consisting of bromine and silver in equal proportions, and the atoms of each are arranged in a definite order upon the plate. We are taught that all atoms are free to move, so the atoms of bromine and silver are free to move, and the action of light is to move these out of their position, and they are, as it were, polarized. There is no evidence that the bromine is given off, but the position of the atom is changed. I consider the action of light simply causes a rearrangement of the atoms.

In the daguerreotype process we have a copper plate which is coated with silver by electrical deposition, which receives a high polish. This surface is exposed to the vapor of iodine and bromine, which produces a sensitive film. After exposure, this is developed by subjecting the surface to the vapor of mercury, when the mercury combines with the silver of the exposed portions, forming an amalgam. But there is no evidence that a sub-iodide or sub-bromide of silver is formed. In the modern plate the case is somewhat similar, but the results of the application of the various developers are different. Every one present has, no doubt, experimented with the simple form of galvanic battery, made of simple elements of zinc and copper, which, when properly coupled, give a current of electricity, and has noticed that the action only lasts a short time. This is due to the plates becoming polarized, or, in other words, the hydrogen of the decomposed water adheres to the negative element and prevents further action. In Daniel's battery, which gives a constant current, the negative element is immersed in a solution of sulphate of copper, and the evolved hydrogen is used in reducing the copper from its combination with sulphuric acid, and thus removed.

In development there is a similar process going on. You have the atoms of silver bromide which have been acted upon by light on the one side, and the hydrogen atoms of the pyro on the other. A weak electric current is established, the water becoming polarized and presenting its hydrogen atoms to the negative element, silver bromide, and its oxygen atom to the positive hydrogen of the pyro. The immediate result is the decomposition of a molecule of water, the hydrogen of the water, not of the pyro, combining with the bromine of the silver bromide, thus reducing the silver to the metallic state, hydrobromic acid being formed. The oxygen of the water combines with the hydrogen of the pyro.

A plain solution of pyrogallic acid will exert some developing action on a plate, but this action is very slight. Here we have hydrobromic acid formed immediately reduction takes place, and nothing to combine with it and remove it. When an alkali is also present in the solution, the alkali combines with the hydrobromic acid as soon as it is formed, and the development is continuous.

Some years ago I experimented with the view of developing by water alone, and after many failures succeeded. I prepared a copper plate, coated with collodio-bromide emulsion, and exposed it in the camera in the usual way. I then placed the copper plate in water, and also a zinc plate, and caused them to touch at the edges, when I got a faint image. For example, in a landscape subject the sky would perhaps appear, but with very little detail. In a further experiment an ordinary gelatine emulsion plate was used. After exposure the film was stripped from the glass and transferred to a plate of silvered copper. This was immersed in distilled water, with a slight trace of alkali-ammonia. A zinc plate was also immersed, and caused to touch the copper plate, and the picture which I pass around was produced.

Temperature has an influence. If the water be intensely cold, scarcely any development is possible, while, as the temperature is raised, so the action increases.

There is nothing written, so far as I know, as to what is the result of developing on the developers themselves. It seems a very obscure point. The probability is that the first stage of oxidation of the pyro is the formation of a brown purpurogallin, any further oxidation causing the carbon molecule to fall to pieces, thus liberating carbon in the film in the form of the well-known pyro stain.

EDWIN BANKS.

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VICTOR SCHUMANN, in "The International Annual," calls attention to the fact that when plates are being rendered sensitive to red light by bathing in cyanin, very careful selection of the plate is necessary to ensure success. A plate which, uncolored, makes a good negative, will not necessarily give a similarly good result when bathed in cyanin. The most suitable are plates containing very little or no silver iodide. Slow plates will be found to give the best results, and a plate sensitized in cyanin should be used immediately it is dry. Of all methods, Schumann prefers preparing the emulsion personally, washing the gelatine repeatedly in distilled water before cooking. The emulsion should be poured onto the plate soon after its preparation, because its sensitiveness, and, therefore, its tendency to fog, increase gradually.

* * *

THE following is recommended by Fleck as the most desirable yellow screen for use with plates that have been color-sensitized with erythrosine. Dissolve 10 parts of acridine yellow in 150 parts of alcohol, and 5 parts of fuchsin in 100 parts of alcohol. To 100 parts of 2 per cent. raw collodion add 20 parts of the acridine solution and 7 to 8 parts of the fuchsin solution.

* * *

NAPOLEON SARONY.—With the sudden death of this veteran artist-photographer, the profession has lost one who was looked up to as its dean. The name of Sarony has been a very familiar one for many years, and has been associated with a man who was a master of pose, a skillful wielder of the brush, and of a buoyant temperament. The story of his life is familiar to our readers and need not be repeated here. His son, Otto Sarony, who has for many years been prominently connected with the business, will continue it on similar lines to those followed before his father's death.

FIGURE STUDIES AND PICTORIAL PORTRAITURE.

IN an interesting paper on this subject, read before the Manchester Amateur Photographic Society, Mr. T. Morley Brook emphasized the necessity for careful thought before introducing figures into a picture. He said in part:

"The introduction of figures into photographs is always attended with a certain amount of risk, but when successfully accomplished it is pre-eminently interesting. There seems to be more interest taken by most people in pictures that have figures in them. I have often noticed when showing my landscapes, etc., that after a few have been looked over attention droops, interest fails, and 'thanks so much' they say; they are very beautiful, but, for all that, I can see that my much-loved landscapes have fallen flat. But on introducing a few figure studies or portraits, our friends brighten up at once. They can understand and feel an interest in these, and quite naturally so, for in pictorial art there is a great and universal craving for strong human interest.

"There are two ways in which figures can be utilized in making pictures—in landscapes as figure studies, and as portraits pure and simple. I shall not have much to say about the first of these, but will try to give a hint or two that may be useful.

"Before introducing a figure into a landscape be very sure that there is a real necessity for its being there at all. It should either aid the composition or enhance the interest in some way—that is, draw attention from or to some part of the picture, emphasize or break a line, contrast or balance a mass of light or shade. Suppose we are photographing a picturesque old cottage, backed by a group of trees on the one side; on the other side is a bare plowed field. You will see at once that it lacks balance. Now, here is a chance for introducing a figure or figures, but we must be very careful that they are appropriate to their surroundings or the result will be disastrous. If, as is often the case, some companion in modern costume be introduced we shall get an abominable discord. Better, a thousand times, do without the figure. If it be worth the trouble of photographing at all, it is surely worth while to have the whole harmonious; so get a rustic in rustic costume, and do not make the mistake of having the figure too large. Remember that the cottage is the motive of the picture; if the figure is large it will balance the picture too much, in fact, making it two pictures in one. So make your figures small, just sufficiently large to make the balancing point required, and in posing see that the pose also is appropriate and as unconscious as may be. Most people, directly they know that they are being photographed, get into stiff and unnatural positions. The best way to overcome this is to get them to do something, and, working with a large aperture, use a slow shutter, or, if that be not possible, pose them in any easy and natural way suggestive of occupation. Do not keep them waiting long, but do not on any account get flurried.

"Figure studies may have quite a value of their own as objects of art, and I think that the amateur photographer might profitably devote more time and attention to the production of figure studies and fancy portraits. Surely most, if not all of us, have friends who are fond of being photographed, and would be delighted to become our models, and even put themselves to considerable trouble to obtain such dresses and accessories that we may require to make up the desired picture. These need not be expensive or yet elaborate ; in fact, the more simple and quiet they are the better chance of success. It is only after some experience that you find this out, and you will find that the simple subjects are those which continue to charm the longest. A capital rule to observe, 'When in doubt, leave out' ; aim at simplicity and leave out everything that is not absolutely necessary to the chief idea of the composition. Once you begin with elaborate costumes and many accessories, your troubles will be increased and you will be apt to get stagey, studied and stiff effects.

"There should be no lack of subjects, for they are close at hand in every home, at every street corner, and in every country place. There are pictures in the kitchen—preparing dinner, etc.; pictures in the sitting-room—reading, painting, comparing notes, etc.; pictures innumerable in the nursery (if you be the happy possessor of one). What can be more charming than pictures of pretty children, and what child is not pretty? We can have Kitty peering impudently through Granny's spectacles ; Master One-Year-Old, holding up his empty spoon as he sits behind his empty plate, in the act of exclaiming, 'All done!' or holding up his little night dress containing a few toys and revealing his beautifully moulded fat little feet and ankles ; or that little demon Tom, taking a quiet puff at his father's pipe, teasing the cat, or teaching Towser to beg. Suggestions such as these crowd upon one when we look at such models. Any young lady can be converted into a charming little nun by a few skillful turns of a simple white cloth. Of course we must take the head only in this case, and the eyes should be modestly cast down. A slouched hat and a cloak artistically thrown round the shoulder will convert an every-day young man into an Italian bravo or an American cowboy. Place the right hand of one of the foregoing into the right hand of the other, and tell them that you want to represent a pair of lovers about to part, 'It may be for years, it may be forever,' and if they have an atom of histrionic feeling in them, they will soon produce the expression desired.

"Whole stories may be worked out in this way, and, if we could get suitable models, it would be good practice to take some good novel and illustrate it with a series of pictures of the principal situations. Remember this particularly, a face need not be beautiful to make an interesting picture ; indeed, a positively ugly one, if the character be well brought out, often makes a most successful picture. A rough and rugged old sailor, fisherman, gardener, or laborer, struggling with a newspaper, smoking a dirty old pipe, or going about his ordinary work ; a wrinkled old woman bending over her knitting, or patting her little grandchild on the head—all these are most decided objects of interest, and, with a little management and tact, may be made into objects of art. Subjects that strike us naturally when looking at the models ready to our hand are the most desirable; for figure studies, as in the ordinary portrait, the great desideratum is naturalness.

"Amateur portraiture, whether in the pleasant and secluded back garden, or in the still more secluded room indoors, is a branch of photography in which most, if not all of us, at some stage of our career, are tempted to indulge. But, as a rule, after gaining a little—a very little—experience, the amateur seems more and more to fight shy of portraiture, more's the pity; and if asked the reason why, he will most likely say that if now and again he succeeds to his own satisfaction, it is very, very seldom that he does so to that of his sitter.

"Pictorial portraiture is perhaps the most difficult branch of photography; and not only is it difficult to learn, but it is also most difficult to treat well in words. By pictorial portraiture, I mean something that is a little different to the ordinary marble and putty studio likeness. It is unfortunately a fact that amateurs mostly fail when they attempt portraiture, but there is no reason in the world why they should do so. They have conquered the world of landscape and raised it almost to a fine art, and, if equal pains were taken, I do not see why they should not do the same for portraiture. It has often been said that portraiture is out of the legitimate province of the amateur, but I do not agree with that at all, and was pleased to read the other day that Mr. Frank M. Sutcliffe, the eminent professional, does not think so, either. He said that he 'did not agree with his fellow-professionals who thought it a good job that amateurs generally failed at portraiture; in fact, his opinion was that portrait photography would get no "forrarder" till amateurs mastered it.' The fact is that the amateur can afford to disregard the conventional idea of what a good photograph is, or ought to be. The general opinion of what constitutes a good photographic portrait is based on wrong foundations altogether. It simply embraces retouching, painted landscapes, imitation furniture and accessories, artificial plants, trees and grasses. Then, again, an amateur can trim his prints to any size he likes, can diffuse his focus to any extent, and leave his subject some sign of being made of flesh and blood—which is more than most professionals dare do. Simplicity distinguishes a pictorial from a common-place portrait more than anything else—simplicity of dress, subject, background, and general treatment. Next to simplicity comes truth. If you want a portrait of your friend, don't dress him or her in their Sunday best; don't place them in a grand (imitation) marble hall, nor yet in front of an impossible landscape, but let them be clothed in their most comfortable ordinary clothes and put them in congenial surroundings; and, more than all, let them pose themselves, and when they are settled comfortably, just very quietly make any little alteration that may be essential. Whenever you see what seems to you a good portrait, study it, and try to find out why it strikes you, and in nine cases out of ten you will find that everything is made subordinate to the figure, and in the figure itself all the lights are subordinate to the light on the face, that being the principal object, and nearly always you will find that elaborate accessories and irritating details are conspicuous by their absence.

"The background should be selected very carefully; see to it that it is as inconspicuous as possible. If indoors, try to have a wall-paper with a very small pattern or none at all, and in focusing throw this as much out of focus as possible. If you are working out of doors avoid a background of ivy, as the smooth, shiny leaves are apt to reflect so much light that in the print they form a mass of irritating high lights, attracting far too much attention, and giving it a spotty appearance. Another background to avoid is a brick or new stone wall.

"I mentioned retouching as one of the false foundations on which photographic portraiture was based. Understand me, please, I do not see any reason why casual or accidental defects should not be obliterated from the face, provided that the important lines and shades and the texture of the natural face be not tampered with. But I have a perfect horror of the stippling that has become so universal in portrait work. There is neither art, nor truth, nor beauty, nor even common sense, in it. The faces so retouched look like putty or marble, lose all the beauty they ever may have had. I would much rather see faces freckled and furrowed than done to death by this ridiculous misapplication of labor.

"And now I will try and give you a few practical hints that may prove useful to some of the younger ones—the older hands I do not attempt to teach. In the first place strive to lead the sitter to forget that he or she is about to be photographed; try to draw him out to animation, to make him come out of himself for a time. As to the light, some little difficulty may at first be experienced, as the actinic power of light indoors is very different from that outside, and the difference can only be determined by practical experiment. The chief fault of the general amateur in outside work is over-exposure, the opposite is the almost universal defect with indoor work, and of the two evils the latter is by far the worse; for with careful intensification, a thin, over-exposed plate may be made to give a really good print, but literally nothing can be made of an under-exposed one. The most essential characteristic of good portraiture is harmony and softness in the flesh tones.

"The windows of rooms are so various in size and general position that no definite directions can be given as to how best to use the available illumination, but it may be laid down as a general rule that the light should come from one direction only, so if there be more than one window in the room make careful choice of the one that will best suit your requirements, and block out the strong light from the other with thick blinds or curtains. It is important that the windows should be as large and especially as lofty as possible, the upper part having an unobstructed view of the sky, preferably facing the north, but east, west, or even south may be made to do. One great difficulty is to get sufficient light when away from the window, and another is to get a soft, diffused light. How to get over these difficulties I will endeavor to explain. If the light be strong, pin over the window some thin, fine gauzy stuff—book-muslin I think it is called—the finest and thinnest you can get. This will diffuse the light very nicely without stopping out much of it. In order to avoid too deep shadows, a reflector may be required to throw some light on the shadow side of the figure. I use a large white tablecloth thrown over a movable screen or clothes-horse. Do not place it too near the figure, or you will get cross lighting, which is very objectionable. The lens used may be a rapid rectilinear or a single landscape, the latter for preference if the open aperture be not less than *f* 8, and the full aperture should always be used, as, by doing so, not only is the time of exposure shortened, but stopping down only serves the inartistic purpose of bringing all the planes into sharp focus, which is also very objectionable in portraiture, destroying, as it does, any suggestion of atmosphere. Use a lens of the longest focus possible, so as to avoid distortion. Use the fastest plate you can get, as this not only shortens exposure, but as a rule they are not so liable to give great contrast as the slow ones are.

"In determining the length of exposure to be given, do not take notice of the high lights, they will take care of themselves ; look for the deepest shadow and expose for that.

"As to development, use that developer you know most of, only keep down the developer—*i. e.*, pyro, hydro or whatever it is—and use as little bromide as your plates will permit. Personally I must allow that I still prefer to use good old pyro-ammonia, about—

Pyro	1	grain.
Bromide	$\frac{1}{2}$	"
Ammonia	2 to 4	minims.

to each ounce of developer.

"The aim in development must be to secure negatives full of detail and gradation, without great density.

"In conclusion, let me impress upon you that you cannot take too much pains ; inattention to seemingly the most trifling details is a frequent cause of non-success. Above all, do not hurry ; work quickly and smoothly as possible, but take time. If you fail, do not be ashamed of showing your failures to your more experienced friends, for they, too, have made similar failures, and will be able to point out the why and wherefore. Never rest content until you have found out why and where you went wrong."

This paper is one that appeals strongly to the amateur photographer, and one that might with advantage be read before our societies, and made a subject for discussion and interchange of experiences.

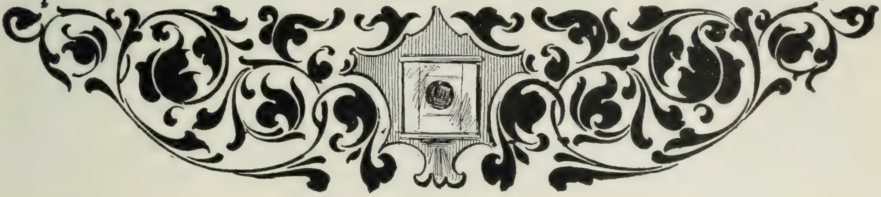
◆

PLATES that have been wrapped in newspaper will often show the printing after development. This impression, it is said, can be entirely removed by bathing the plates before development in a 2 per cent. solution of acetic acid, well washing in water, and then treating with alcohol.

◆

A PATENT has been granted to Will. H. Olmsted for the lantern-slide mat known as "Olmsted's Lantern-Slide Mat." This mat permits of making any size or shape of opening without any other instrument than a sharp pocket knife.

SOCIETIES



THE Springfield Camera Club will hold its Seventh Annual Print Exhibition at Memorial Hall, Springfield, on December 7th to 9th, inclusive. The Secretary writes that "it is proposed to have this exhibition especially characterized by the high quality of the work shown, and to that end all the leading amateur and professional photographers of the United States and Canada have been asked to exhibit."

No prizes will be offered, and no admission fee charged.

THE Bozeman Camera Club is a new organization located at Bozeman, Mont. This is the first and only camera club in that State, and, judging by the energy of the Secretary, Mr. P. C. Waite, it is likely to prove successful.

THE Photographers' Association of Michigan will hold a convention on February 2 and 3, 1897, at the Art Museum, Detroit. At a recent meeting of the Executive Board, details regarding prizes were discussed. An interesting step taken was in deciding to make a special feature of amateur exhibits. To this end classes in landscapes, marines, instantaneous photography, cloud effects and composition will be arranged for amateurs. A gold medal is offered for the most artistic novelty in photography. This is open for competition to all the world. Practical demonstrations will be given, and there seems to be every prospect that the convention will be a huge success.

THE First Annual Convention of the Photographers' Association of Pennsylvania will be held at Harrisburg, Pa., on January 26th to 28th, inclusive. Applications for space for exhibit must be made to G. Taylor Griffin, Wilkes-Barre, Pa., prior to January 10th. All exhibits must be delivered in Harrisburg by January 23d, addressed to J. B. Schriever, Russ Hall, charges prepaid. Dealers and manufacturers' exhibits must be shipped to E. E. Seavy, Secretary Photographers' Association of Pennsylvania, Russ Hall, Harrisburg, Pa. A copy of the Constitution and a prospectus of the coming convention may be obtained from the Secretary.

THE Photographers' Association of Wisconsin will meet in convention in March, 1897, in the city of Milwaukee. Communications should be addressed to Frank Zivney, 211 State street, Milwaukee, Wis.

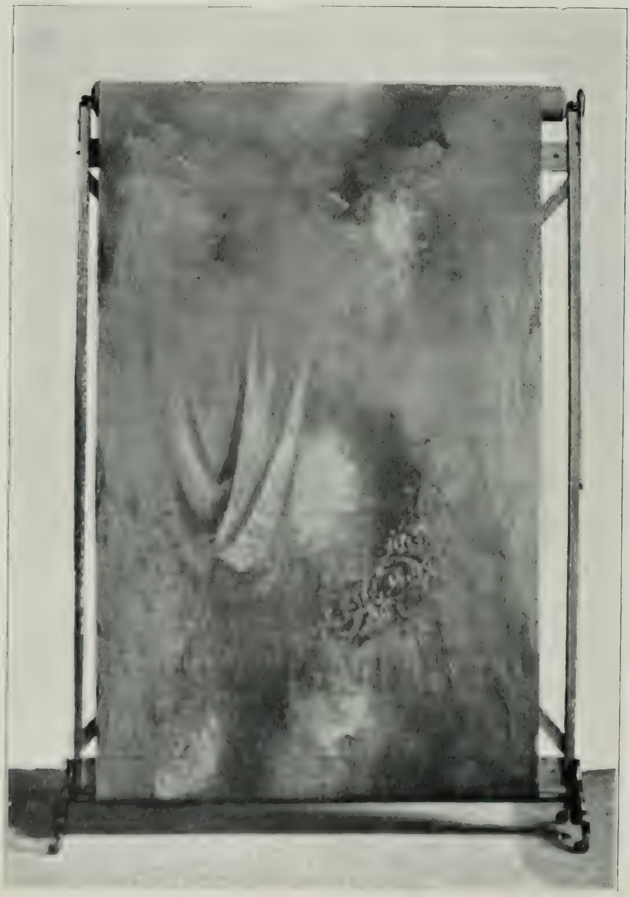
A REVISED list of photographic societies appears in the ninth volume of "The International Annual." This list is compiled from details received from the secretaries of the said societies. In some cases no replies were vouchsafed, and any incompleteness must be charged to failure on the part of secretaries to respond to our inquiry. We shall be glad to receive condensed reports of society meetings, and to render any service to secretaries.

PHOTOGRAPHIC societies in this country would do well to devote some portion of their coming season to a discussion of the methods of photo-reproduction. The illustrated press offers ample excuse for the query, "How are the blocks made from the photographs?" And the answer is not difficult to find, nor is the field an uninteresting one for the amateur photographer.

OUR photographic societies seem to accomplish very little, considering the number of practical men belonging to them, and the opportunity offered for exchange of ideas and co-operative work.

A RATIONAL BACKGROUND.

WE have, in a previous issue of the BULLETIN, made some allusion to the King belt background carrier. The accompanying half-tone furnishes a very good idea of this carrier, and professional photographers will agree that a considerable saving of expense, time and labor will result from the use of this arrangement. A continuous background is so adjusted that, without moving the sitter, a variety of designs may be employed. Indeed, there are at least forty different effects that may be obtained, with no inconvenience to the sitter and without the removing of rollers and hunting around for grounds, such as is the case when working with the old individual bust grounds. All that is necessary is to pull on the leather band shown at the right of the figure. The ground is always fully stretched, the wear and tear on its face is practically nothing, and the whole outfit is so simple in construction that it cannot fail to work properly on all occasions. We commend it to the earnest consideration of all photographers, for it permits of a large saving of expense, offering at the same time the most convenient means of obtaining a large and easily handled assortment of grounds.

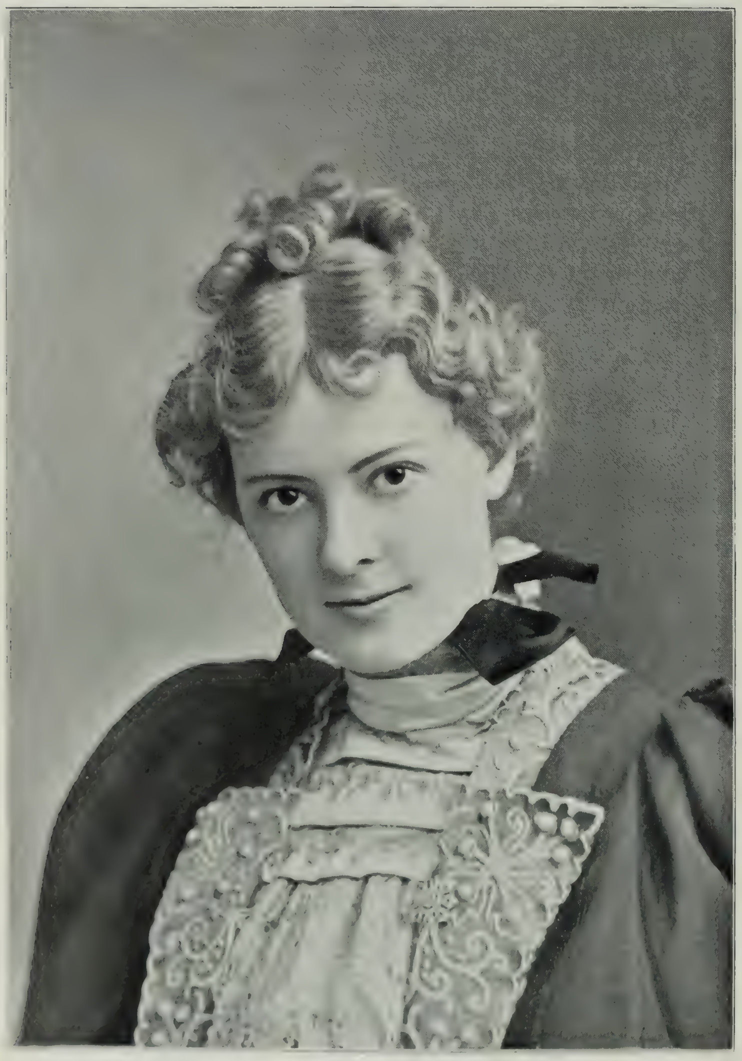


PROCESS WORK

A NEW CROSS-LINE SCREEN.

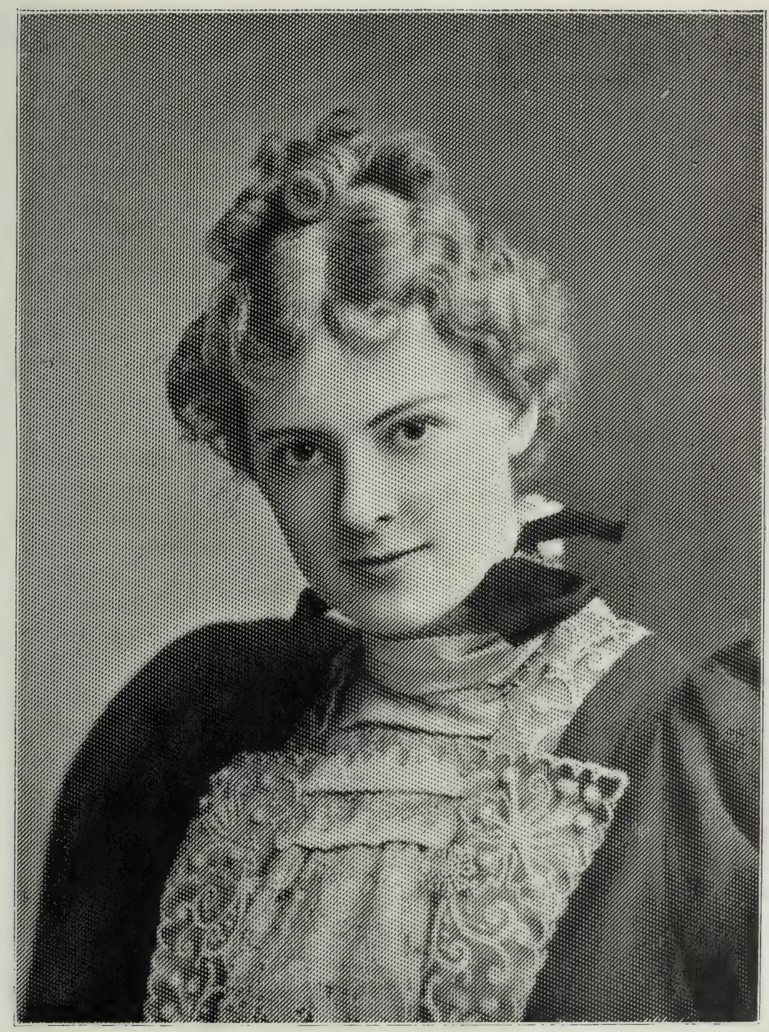
PHOTO-ENGRAVERS the world over will be interested in learning that a new cross-line screen, differing in the process of manufacture from those previously on the market, is now being made by T. A. Richards, who enjoys a world-wide reputation as a maker of ruling machines. These latter are probably as well known in England and Australia as in this country, and their accuracy and high efficiency are testified to by their employment in the most delicate work. For some time past Mr. Richards has been giving considerable attention to the production of a really efficient screen for half-tone work, and he has succeeded in producing what we think to be a screen that has all the desirable qualities and is free from some of the defects inherent to some of the screens previously manufactured. Examination with a microscope of considerable power reveals the fact that these new screens have perfectly transparent spaces and absolutely opaque lines. Of particular note, however, is the circumstance that the edges of the lines are absolutely sharp, there being no signs of fraying or fracture of any kind. With the apparatus of high efficiency now in the possession of Mr. Richards, we understand that he is able to rule screens of any size and with almost any fineness of ruling, and to turn out such screens at ten days' notice. Of course, considerable stock is kept on hand, and the usual run of orders can be filled immediately. Screens of special design can be made to order, and there is every prospect that the engraver will profit largely by Mr. Richards' new venture. Our publishers have undertaken the sole agency of these screens for the American continent, and any information regarding them will be cheerfully furnished. In this issue of the Bulletin will be found several half-tones made by the aid of the Richards screens, and details regarding them are given underneath each print. The one made through the split-line screen illustrates the accuracy of the machine employed by Mr. Richards, and, further, demonstrates his ability to make or rule anything in the line of ruled screens. We shall, in future issues of the Bulletin, use exclusively these screens, and our readers will be able to judge of their efficiency from actual work made with them. The samples shown in this issue of the Bulletin seem to us to indicate that the screens through which the negatives were made are perfect in every way.

We should like to have our readers express an opinion on the efficiency of the split-line screen and on its adaptability to coarse printing.



AMY BUSBY.

Photographed by Morrison. Engraved by Hagopian Photo-Engraving Co.,
Using Richards' Cross-Line Screen, 120 lines to the inch.



MADE WITH RICHARDS' SPLIT-LINE SCREEN.

Photograph by Morrison.

We would point out that all these illustrations are printed with the type matter, and have received no further treatment than such as is ordinarily accorded to half-tones. All were made by the Hagopian Photo-Engraving Company, of this city.

THE P. & B. PHOTOGRAPH LACQUER.

PHOTOGRAPHERS and photo-engravers suffer not a little from the wearing out of tanks, trays, baths and troughs, and a really efficient means of renovating these has been sought for a long time. In the compound sold under the name of P. & B. photograph lacquer such a material is to be found. This lacquer is a black liquid, which is put up in tin cans with screw tops, and is readily applied to the clean and dry tray or tank by the aid of a broad brush. These brushes should be kept in water when not in use, and a long-handled brush should be employed for a large surface. When using it on a tin or iron tray or tank, the rust should be scraped off before the lacquer is applied. By the use of this lacquer, tanks and trays that have been deemed useless can be made to serve for a long time. A crack in a tank can readily be filled with it, and made thoroughly water-proof and acid-proof. There is no heating required, and it is always ready for use. It dries very quickly, in about ten or fifteen minutes, and when dry is perfectly odorless. We recommend it to photo-engravers as a thoroughly efficient article, well worthy of their attention.

HALF-TONE DIRECT FROM NATURE.

IN "The International Annual and American Process Year Book," Mr. William Gamble writes on the possibilities of direct half-tone from Nature, and expresses an opinion that in the near future the tendency will be towards making half-tone negatives directly from the natural objects rather than from the print. In a paper read before the Royal Photographic Society, Mr. Gamble stated that one of the principal difficulties was the exposure, but the introduction of process dry plates permitted a much closer adjustment of the screen, and a consequent increase in rapidity, enabling a larger stop to be used. Of course, even with process dry plates the exposure would be too prolonged for moving objects, and here is indicated a line of research that might well be followed up. Rapid plates, giving sufficient clearness for process work, are very desirable, and, with such, process work would receive a decided stimulus. Landscape and architectural work readily admit, however, of the use of the cross-line screen in front of the plate.

A great difficulty in subjects which possess considerable contrast was that the high lights became closed up before any dots were obtained in the shadows. This could be got over by making a preliminary exposure on white cardboard with a small stop, or by directing a spot of intense artificial light by means of a condenser to the center of the stop. Such methods, however, did very well in or near the studio, where the exposure could be made at once, but how were they to be made practicable for outdoor work, so that the plate could be changed. At first the idea suggested itself that a number of plates might be prepared beforehand with a fine dot all over (not larger than it should ultimately be in the shadows). They could then be exposed when required at any time out of doors or elsewhere, and the effect of the second exposure would be to enlarge the dots only in the half-tones and high lights of the picture, while the original dots, representing the shadows, remained practically the same size. But the difficulty was how to reinsert the plate in the dark slide in exact register with the screen, so that the dots already impressed would fall just under the screen openings. This, so far, was an unsolved problem. Of course, the operator could use the sheet-of-cardboard dodge out of doors at the time of the main exposure, except that it would be inconvenient to carry a sheet of cardboard about, and rather funny in the eyes of the "man in the street" to be seen using it. Possibly something in the nature of a heliostat could be fixed in front of the lens, in order to direct a strong spot of light through the diaphragm, but it seemed likely to have its inconveniences. An ingenious method had been suggested by Mr. Deville, the Surveyor-General of Canada, of making a first exposure in the ordinary way without the screen, and afterwards to expose the plate, before development, under the cross-line screen, so as to impress a dot system on the plate. Unfortunately, as the author himself admitted, this process did not improve the shadows and increased the difficulty of getting sharp dots. Mr. Gamble had tried the process, but it gave clean whites on the zinc and grayed shadows, while the half-tones were apt to wash away, leaving a very poor result. Of a similar nature was the process patented by Kunkler and Brunner for making a grain in dry plates during the course of manufacture, and the result would be pretty much the same as in the process described by Deville. There was another patent in existence for impressing a preliminary grain on the plate as an adjunct to photogravure. For such a process it was conceivable that it might answer because the etching process was discriminating, the resist being bitten away in exact proportion to the action of light. Probably by using the Warnerke Tissue Process it would be possible to utilize the grain plate method of negative-making for half-tone.

Vignetted screens seemed to offer advantage for direct half-tone, as they could be placed in contact with the plate, and were independent of the size of the diaphragm so long as it was not too large. It seemed, however, that there would be a difficulty in getting sharp dots, though this, perhaps, might be remedied by reduction and intensification, according to the usual practice.

Chessboard screens appeared also to have advantages, as they could be used very readily with multiple aperture diaphragms; and as Deville pointed out, the more apertures in the diaphragm there were, the quicker the exposures. The fact that Levy had purchased Deville's patent appeared to show that there was something in the idea, and possibly the chessboard might be one of the screens of the future with which direct half-tone work would be accomplished.

It was suggested that it might be easier and quicker to make an ordinary negative for the direct view, and from it make a positive, which could be used in the enlarging camera to take the half-tone plate from.

There was another method proposed by Deville, but previously or simultaneously practiced by Mr. J. A. C. Branfill, of placing a positive in the printing frame, with the screen between it and the sensitive plate, a disc of light being thrown from an enlarging lantern on to the printing frame, a suitable size and shape of stop being in the projection lens. This resulted in a dotted negative. Though these methods could not be described as "direct," they were likely to give more of the vigor of the original negative than would a copy from a paper print, and the exposure would be shortened.

Mr. Gamble concluded by saying that the whole question of direct half-tone from Nature was still in an experimental stage, and he regretted he could not describe any one process as being exactly the way to do direct work. He, however, believed it would be among the problems solved in the early future.

PROCESS NOTES.

A monthly magazine entitled *L'Image* is to be published in Paris in the interest of wood engravers.

* * *

It is estimated that there are 3,985 paper mills in the world, the output being about 930,000 tons of paper. Of this enormous quantity, 465,000 tons are used for printing purposes, nearly 300,000 tons being used in newspapers and periodicals. The government offices of the world consume 100,000 tons, the schools 90,000 tons, commerce 12,000 tons, and trades about 90,000 tons, while private letters and the like make up 52,000 tons. These paper mills employ 270,000 hands, about two-thirds of whom are women.

* * *

To mount paper drawings on cloth, this latter is first tightly stretched by taking it down on a wooden frame or stretcher. It is then coated with strong size and allowed to remain until nearly dry. The paper to be mounted is then well covered with paste, set aside for a few minutes, again pasted and then laid down on the cloth and rubbed down. The mounted drawing should not be cut out until it is quite dry.

* * *

"Three-color printing is only in its infancy and a long way from perfection, but the way is well defined by scientific laws. The progress in photography, in the manufacture of pigments, and in printing machines, is bound to bring this new and scientific way of printing to a perfection undreamed of at present."—C. G. Zander.

The object of the shoot-plane is to put a neat, smooth finish on the edges of the blocks, at the same time insuring their being perfectly square and true. This tool consists of a flat iron bed, with grooves at one side in which a special form of carpenter's plane runs.

◆

In the *Process Photogram* a method of "Half-Tone by Means of Collotype" is described by W. Cronenberg. A collotype plate with a medium grain is copied under a suitable negative. It is then well washed, and placed for half an hour in water acidulated with sulphuric or nitric acid, which makes the image very clear and transparent. It is again well washed and then transferred to a strong solution of alum, washed for half an hour and then put away to dry spontaneously. The etching and damping are then effected and the plate inked up until it yields prints showing the finest details. With a good transfer ink, a perfect, vigorous print is now taken on good transfer paper and transferred to the zinc or copper plate by means of a litho or collotype press. It is advisable to slightly roughen the zinc or copper plate by means of acid. For copper, the etching fluid is perchloride of iron in one bath only; strength, 35 degrees Beaumé; for zinc, the etching is as usual. The advantages claimed are: Cheapness, rapidity, true rendering of the original, and the exclusion of the screen.

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For use on router spindles the following oil is recommended:

Bayonne oil	9 parts.
Pure blown rape	1 part.

Mix together, heating to about 110 degrees Fahr., taking care that they mix thoroughly. The rape-seed oil must be absolutely pure.

◆

The larger the number of copies made from a subject, the less likelihood is there of obtaining the full tonality and detail of the original. By continued copying, indeed, it is probable that a result might be obtained in which all the half-tones are absent, high light and shadow alone remaining. The subject of half-tone direct from Nature deserves more attention. In "The International Annual and American Process Year Book" for 1897, William Gamble gives some interesting points on this topic.

◆

A patent has been granted in England, dated April 19th, to W. H. Clasen for a method of preparing a sensitive film, which is specially adapted to photo-mechanical printing. The glass or metal supporting plate is first coated with a layer of resin soap, and over this is coated a layer of chrome gelatine, containing preferably sal ammoniacal ammonium chromate. After exposure, the plate is washed in slightly alkaline water. The fatty ink is repelled by the parts of the surface containing moisture and attracted by the resinous particles contained in the unmoistened parts of the surface.

THE advantages claimed for dry plates over wet collodion for process work are summed up as follows: No glass to be cleaned and albumenized; no silver bath to get out of order; freedom of the image from markings and streaks caused by imperfect cleaning of the glass, by unsuitable collodion, etc; no steaming on the screen; plates ready at a moment's notice; brilliant negatives obtainable in a light in which wet collodion could not be worked. To which may be added longer life to plate-holders. The drawbacks are: Film of negative not so transparent as collodion; reduction of the image not so easily performed on dry as on wet plates; dry-plate negatives require longer time in developing and intensifying.

* * *

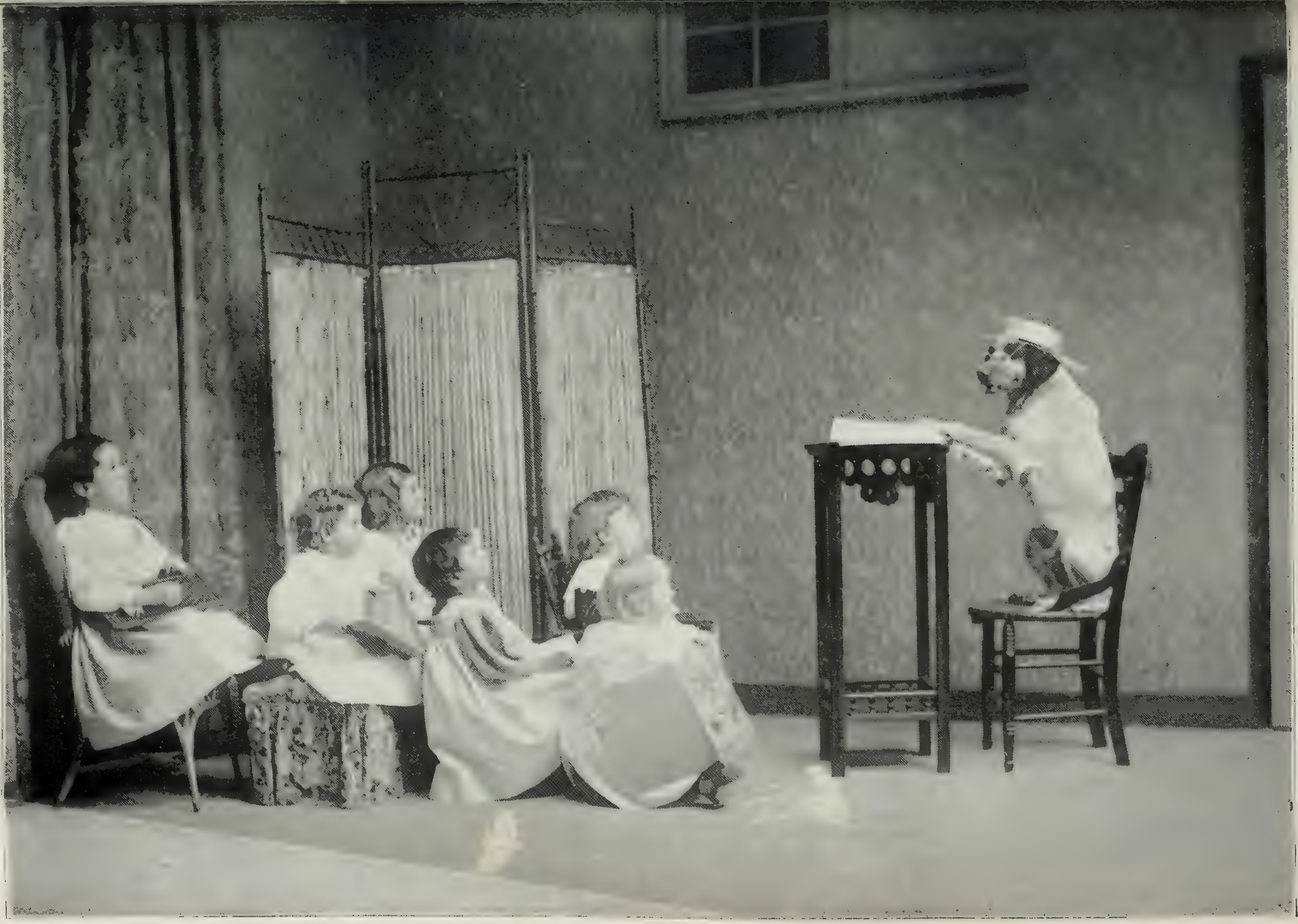
THE iodo-cyanide method of reduction so extensively used in wet-plate work can also be used for dry plates. It is recommended to make up two stock solutions. To 1 ounce of iodine crystals add 3 ounces of potassium iodide, and just cover the whole with water, making a saturated solution. To a pound of potassium cyanide add sufficient water to cover t[illegible]rystals. When any of the solution is used from either bottle fill it up again with water and give it a good shake. With these strong solutions reducers of varying strength are easily made, weak for negatives that are only slightly over dense, and strong for very dense ones. The cyanide stock solution should be used in the proportion of about 7 to 1 of the iodine stock solution, and then diluted with water to the strength required. Test it on an old plate.

* * *

IN photographing glittering metal objects it will often suffice, if the metal object is quite dry, to dust the shiny places with finely powdered starch, arrowroot, flour, or any such powder. In the case of bright stee[illegible]c., the shiny places may just be dulled by dabbing them with putty. In the case of glass objects care will be needed in applying the putty so as not to leave patchy marks. In the case of solid silver, gold, and plated objects, gently breathe on them, and then with a tuft of cotton wool dust the parts with very finely powdered whiting. If the objects are hollow (*e. g.*, goblet, teapot, etc.), place inside them a few pieces of ice a few moments before making the exposure, and wait until very fine dew just begins to deposit from the surrounding moist, warmer atmosphere. This produces a fine "frosted silver" effect which tells well in a photograph. Do not, however, wait too long, or the dew specks gather into large drops, and the effect passes away. As soon as the exposure has been made, the articles should be at once dried and polished.

THE EASTMAN COMPANY AGAIN DEFEATED.

AS we go to press, we learn that Judge Townsend has handed down a decision denying the application of the Eastman Kodak Company for an injunction against Getz & Hoover, who at the time the suit was brought were doing business under the name of the Buffalo Argentic Paper Company. Our publishers acquired an interest in the Buffalo company to enable them to direct the defence of the suit.



Photograph by Rösch, White Plains, N. Y.

A DOGGEREL.

Engraved with Richards' Cross Line Screen, 120 lines to the inch, by [illegible] Photo Engraving Co.

Manual of Photography prepared for use in the U. S. Army, by Samuel Reber, first lieutenant of the Signal Corps. This is a well illustrated, practical handbook of photography, in which no words are wasted. The whole subject is dealt with in 106 pages, and yet the author seems to have lucidly described all that is necessary. A chapter on the use of the camera in topographical work is of considerable interest.

One of the most useful and handsomely printed catalogues that we have seen reaches us from Mullett Brothers Photographic Supply Company, of Kansas City, Mo. A fine paper has been used, with the result that the carefully selected illustrations are brought out to the best possible advantage. Messrs. Mullett Brothers carry a complete line of photographic apparatus and supplies, including practically every reliable article.

Photographie des Couleurs is the title of Leon Vidal's new book published by Gauthier Villars et Fils. A three-color print with the three flat tints illustrate the author's remarks, and the book will much interest those studying the reproduction of color.

The Elements of Stereoscopic Photography, by C. F. Seymour Rothwell, and published by Percy Lund, Humphries & Co., Limited, is a plain, simple discussion of the principles underlying this most interesting of all photographic methods, and of the method of obtaining really satisfactory results.

The Process Work and the Printer, published by the same company, is a welcome monthly visitor, containing many practical pointers, and being excellently printed.

Many hysterical articles by parties interested in various makes of dry plates are being published by some of our smaller contemporaries. The critics in every case apparently have not read the original article on "Commercial Orthochromatic Plates Without Color Screens" with the care that a critic should employ. Epithets and unfounded accusations are not arguments, and we have yet to learn that the facts as stated are incorrect. As we take it, a certain number of experiments were made with certain plates under certain conditions, and the results were published. These results have not been confirmed nor have we seen an "illustrated" denial. The publication of this paper was timely, and should lead to a calm discussion of the merits and methods of using so-called orthochromatic plates. Rash assertions against demonstrated facts is the way the case now stands.

Particular attention is called to the fact that the American Aristotype Company have placed on the market their pure gold and platinum solutions in 50-cent bottles. Aristo-Platino paper is beyond all cavil the best printing-out paper that the photographer has ever had prepared for him, and with the cheaper toning materials its use among amateur photographers will doubtless become universal.

The Bulletin is accorded a larger circulation than any other photographic publication in this country. With the help of our readers we can still further increase this circulation, and this with mutual benefit. We shall be pleased to receive any hints or assistance of any kind that will help us in making our journal more useful to the general reader.

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